STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
2 February 1984

COMMISSION HEARING

IN THE MATTER OF:

Application of Samuel Gary Oil Producers, Inc., for a new pool creation and special pool rules, Sandoval County, New Mexico.	CASE 8030
and	
Application of Champlin Petroleum Company for creation of a new oil pool and special pool rules, Sandoval County, New Mexico.	CASE 8063

BEFORE: Commissioner Joe Ramey
Commissioner Ed Kelley
Commissioner Baca

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:	W. Perry Pearce, Esq. Legal Counsel to the Division State Land Office Bldg. Santa Fe, New Mexico 87501
For the Samuel Gary:	W. Thomas Kellahin, Esq. KELLAHIN & KELLAHIN P. O. Box 2265 Santa Fe, New Mexico 87501

A P P E A R A N C E S

For Champlin : William F. Carr, Esq.
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I N D E X

I N D E X

E X H I B I T S

MR. RAMEY: The hearing will come to order.

We'll call first this afternoon two cases, which I understand are to be consolidated. Those are Cases 8030 and 8063.

MR. PEARCE: Case 8030 is on the application of Samuel Gary Oil Producers, Inc. for a new pool creation and special pool rules, Sandoval County, New Mexico.

Case 8063 is on the application of Champlin Petroleum Company for creation of a new oil pool and special pool rules, Sandoval County, New Mexico.

MR. RAMEY: May I have appearances at this time?

MR. KELLAHIN: If the Commission please, my name is Tom Kellahin. I'm an attorney in Santa Fe, New Mexico, and I'm appearing on behalf of Samuel Gary Oil Producers, Inc.

I will have two witnesse to testify.

MR. CARR: May it please the Commission, my name is William F. Carr, with the law firm Campbell, Byrd, and Black, P. A., of Santa Fe, appearing on behalf of Champlin Oil Company.

I have three witnesses.

MR. PEARCE: Are there other

appearances in this matter?

Could I ask all the prospective witnesses to rise at this time, please?

(Witnesses sworn.)

MR. RAMEY: If you're ready, I am.

MR. KELLAHIN: All right, sir.

Mr. Chairman, Samuel Gary Oil Producers proposes the creation of a new oil pool that produces out of the Niobrara member of the Mancos formation.

We believe that this Niobrara section, pay section, is not unlike the Mancos Pool which you created for Jerome P. McHugh recently, and will be similar to the pool that Mr. Al Greer operates in the West Puerto Chiquito Mancos.

The proposed pool area is defined on several of the exhibits and Exhibit A shows you the proposed outer boundary containing some fifteen sections for the proposed pool.

The pool is located in McKinley County -- I'm sorry, Sandoval County, New Mexico. This is a location legend showing you that it's on the edge of McKinley County, just in Sandoval County. This is several miles to the south of the Mancos Oil Pool.

There are several, four, at

least, one, two, three, four wells that are fixed on the cross section which the experts will discuss. We believe that the evidence will demonstrate and show to you that at least for a temporary period of one year the best way to start the development and expansion of the pool is on a basis whereby there is only one well in each 320 acres.

This Samuel Gary Well 11-16 is a very good well and with the evidence we'll demonstrate to you the engineering calculations conducted with regards to the productivity of that well, and we believe the evidence will demonstrate to you that based upon the quality of performance of that well, that one well ought to at least be able to drain and develop 320 acres.

We believe that the evidence will show and demonstrate to you that at the conclusion of our case, that you'll be persuaded that the most effective and efficient method is one well for 320 acres and that if we develop the pool on 160-acre spacing it may result in the drilling of wells that are unnecessary.

Samuel Gary proposes certain special pool rules and I have taken out of the application and xeroxed a copy of the specific pool rules that they propose to establish for the pool.

The principal rule, obviously, is the one well in 320 acres.

In addition, the experts will discuss the proposed well locations within a proration or

spacing unit, it being the request of Samuel Gary that the first well in any section would either be located in the northwest quarter or the southeast quarter of a section.

The operator would have the option, then, to dedicate whichever additional 160 to the first 160 to form a 320. It could be a laydown, a stand up, south half, north half, the first well in the section would establish the pattern and the second well in the section would have to go to the alternate location, the reason being that the evidence, we think, will demonstrate that without this kind of requirement in the pooling rules, that even if there is only one well on 320 acres, if the operator had the option to drill in any 160, it would create the possible situation where you would have de facto spacing on 160's, and the whole point in the first year, we believe the testimony will show, is that it is better to develop the pool by moving the wells apart in that first year and then coming back after the first year and hopefully with the additional testimony and evidence and data that will be developed persuade you and convince you to make those rules permanent.

The evidence will further demonstrate to you that we believe there is a reasonable allowable to be established on 320 acres. We believe that allowble to be 320 barrels of oil per day and 160 Mcf of gas a day. Our engineering witness will talk to you about, in detail, his reasons and justifications for the special rules, and it is our hope and belief that after you've heard our

testimony, that you'll grant our application.

Thank you.

MR. CARR: May it please the Commission, Champlin comes before you today with an application seeking 160-acre spacing in the proposed pool, and also proposes special well location requirements that would require 330 foot setback from the outside boundary of any spacing or proration unit.

We believe that the evidence presented here today will show that the application of Champlin is the appropriate approach for the Commission to take because it will provide needed flexibility to develop this accumulation in a prudent and responsible and economic fashion.

We also believe the evidence will show that the proposal of Mr. Gary, with the present dedication of acreage in this area, has the effect of spacing Champlin out of this pool and will impair their correlative rights.

MR. RAMEY: Thank you, Mr. Carr.

MR. CARR: There's one point, initially, for clarification, it was my understanding that the way the application read that was filed by Champlin, I'm sorry, by Mr. Gary, and I don't have a copy of that application before me, described the acreage slightly different than depicted on the plat that Mr. Kellahin has put on the

wall.

It was not clear to me whether we were talking about Section 18 or Section 8. We attempted to propose rules for the same area and consequently, our exhibits will show that we were picking up Section 8 and deleting Section 18, as shown on the map, and it is our intention to propose rules for the same area that are included within the application of Mr. Gary, and therefore, we would like to amend our application to conform with this area and ask that our exhibit, which have a different outline of the area of interest, be amended by reference, because we're talking about the same area.

MR. KELLAHIN: Mr. Chairman, I believe there is a typographical error in the application and subsequently picked up the wrong section.

I would also seek at this time, then, to correct the record to show that notwithstanding the application, we don't seek the inclusion of Section 8. There should have been a one in front of the eight. We intended to describe Section 18. I think we're all talking about the same thing in here. It's a minor error, I believe, and everybody's willing to proceed based upon the outline of the proposed area as we've defined it on Exhibit A.

MR. RAMEY: I think the townships and ranges are advertised properly so I don't see any problem with what you're trying to do. You're both in

agreement.

MR. KELLAHIN: Mr. Chairman, my first witness is Fred Haddenhorst. Mr. Haddenhorst spells his name H-A-D-D-E-N-H-O-R-S-T. Mr. Haddenhorst is a petroleum engineer residing in Denver, or Inglewood, Colorado.

FRED A. HADDENHORST,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is Fred Haddenhorst and my occupation is consulting engineer.

Q Mr. Haddenhorst, have you previously testified before the Oil Conservation Division of New Mexico?

A I have not.

Q All right, sir, let me ask you some questions about your background and experience.

Would you commence by telling us when and where you obtained your degree?

A I graduated from the University of Wyoming in 1950 with a degree in general engineering with petroleum option.

Q All right, sir, and what was that year?

A 1950.

Q Subsequent to graduation in 1950, Mr. Haddenhorst, have you worked as a petroleum engineer in New Mexico, Colorado, Texas?

A My primary experience has been in the Rocky Mountain Region and California.

Q Where are you currently residing, Mr. Haddenhorst?

A Denver, Colorado.

Q And as a consultant are you currently employed by the applicant, Samuel Gary Oil Producers, Inc.?

A Yes, I am.

Q And what was the purpose of that employment?

A The purpose of that employment was to become familiar with this field that Gary has acquired from Lewis Energy, and particularly from a reservoir engineering aspect, as that's my primary background.

Q Tell us something about your background as a reservoir engineer, Mr. Haddenhorst.

A I started out with Mobil in 1953 and worked eleven years for Mobil, primarily as a reservoir engineer and a reservoir engineering supervisor.

I then consulted for three years and ended up going to work full time for what was then Samuel Gary Oil Producer; worked for them primarily in reservoir engineering and production engineering and at the end of

thirteen years I terminated my employment with them and was Vice-President of Production at that time.

Q Now the area involved in your employment with Samuel Gary Oil Producers includes the area involved in this application?

A Does now; not when I was an employee of Samuel Gary.

Q Your current employment as a consultant involves this area.

A Yes.

Q Does it involve any other areas?

A Not at the present time.

Q All right, sir. Within the area of concern, what directly have you done with regards to your analysis of the reservoir?

A I started last September reviewing the information that Gary had secured from Lewis Energy on the wells drilled in this area and subsequent to that I have spent a good deal of time going through field documents, geological information, engineering information, to acquaint myself with this reservoir.

Q How many wells in the general area have been involved in your review and analysis?

A Ten to fifteen.

MR. KELLAHIN: We tender Mr. Haddenhorst as an expert petroleum engineer.

MR. RAMEY: He is so qualified,

Mr. Kellahin.

MR. KELLAHIN: I have reduced copies of the larger exhibits which may be helpful in the event you desire to make notes as you follow the testimony. We have two exhibits as indicated on the wall.

Mr. Haddenhorst, you can either speak from the reduced copies of the exhibits in front of you or you may approach the exhibits on the wall, whichever you feel more comfortable in doing.

Q Let me have you first commence by looking at what we've identified as Exhibit Number A, or Letter A, and directing your attention to that portion of the exhibit in the upper righthand side of the exhibit, and have you identify for me what is contained in that portion of the plat.

A That portion of the plat shows the proposed fifteen section spaced area, together with the location of the wells drilled within that area with one exception, and I'd like to point out at this time that in the northwest northwest of Section 14 there is a location shown, and that well subsequent to the preparation of these exhibits has been drilled but has not yet been completed.

However we do have electric logs on the well and can show that it correlates with the cross section presented on this exhibit.

Q Let's take that portion of the exhibit and see if we can't use some identifications for wells so

that we can follow you in your testimony.

Beginning over in Section 15 where the "X" is located --

A Yes.

Q -- would you identify for us either a letter number or a letter or a number that will locate that well. What is that?

A That well is shown on the cross section as San Isidro 15-4.

Q That's the 15-4. All right, sir, and as you move to the east or to the right of the cross section line, in Section 14 the well location is now what?

A 14-4. That's the one that has just been drilled.

Q That's 14-4.

A Correct.

Q Up in the southeast corner of Section 11, then, proceeding on to the right, what's the well number for that well?

A The San Isidro 11-16.

Q All right, sir, and the last well, up where it's X' in Section No. 1.

A That's the San Isidro 1-16.

Q All right, sir. When I ask you questions about the wells, I will use those well numbers.

Contained within the fifteen section area

the proposed initial boundary for this pool, what is the formation that you propose to dedicate to the pool?

A It's the Gallup producing interval of the Niobrara.

Q I referred in my opening statements to the Mancos. What is the difference, if any, between the Gallup and the Mancos?

A It's my understanding that the Gallup is an interval in the Mancos.

Q And so when we talk about the Niobrara member of the Mancos, or we talk about the Niobrara being a portion of the Gallup. we're talking about the same Niobrara.

A That's correct.

Q All right. What is indicated on the plat by the sections or portions of sections that are shaded in yellow?

A The sections or portions of sections that are shaded yellow denote the acreage that Gary either owns or on which Gary has operating rights, and this acreage comprises approximately 75 percent of the acreage within the proposed spaced area.

Q What is the significance of the area that is not shaded within the boundary of the proposed pool?

A That's acreage that Gary does not own or control.

Q And there's a legend identifying by lease

number and below the lease number are various names of individuals and companies. What does that mean?

A Those are the companies from which Gary Energy secured the operating rights.

Q All right, and if there is a lease number there that corresponds to a white area on the plat, that would show the various working interest, or at least an indication of who the working interest and/or operators might be for that portion of that section.

A That is correct.

Q All right, sir. I'd like you to outline for me, Mr. Haddenhorst, at this point what you, as the reservoir engineer for the applicant, propose to accomplish with this application in terms of special pool rules.

First of all, defining for me what you anticipate would be the vertical limits of the proposed pool.

A The proposed pool would take in the producing intervals in the Gallup, including the Gallup A, B, C, and D, where present.

Q All right, sir, now with regards to special field rules for the pool there are a number of them listed on the summary of application. Let's go to the first proposed rule and to the lower righthand portion of Exhibit A and have you explain the reasoning behind your request for the well location pattern.

A We propose the wells to be located in the

northwest quarter or the southeast quarter of each section, and within each quarter section we propose that the operator have the option of locating a well in the center of any one of the 40-acre quarter quarter sections.

The thinking behind this is twofold. First, that in attempting to trace what we believe is -- could be a fairly extensive fracture system, this gives some flexibility in determining the locations.

The other thought being that if at some point in time a spacing different from 320 acres is required, that if the wells are located in the centers of the forties it would create less spacing problem.

Q Let me ask you some questions about your opinion as a reservoir engineer, about the reservoir mechanics that you anticipate encountering in this Niobrara reservoir. What kind of reservoir is it and how do you expect it to function?

A The reservoir, from the information we have developed, is a very tight sandstone and shale interbedded intervals, low porosity, low permeability, with some vertical fracturing evident in the core that we took, and it is an undersaturated solution gas drive reservoir, from the information that we have now.

Q Discuss for me generally how the reservoir would produce through the secondary and primary fracture system as you anticipate encountering it in the pool.

A Would you clarify that? When you say how

would we produce --

Q Yes, sir.

A -- through, what do you mean?

Q How would a well react in the pool if it is drilled in an area and does not encounter a major fracture in the fracture system, as opposed to a well that encounters only a secondary fracture or a well that perhaps doesn't encounter any fracture at all that connects it with the fracture system?

A If a well encounters no significant fractures, it's going to be a very low rate producer, and I think this is rather obvious because the formation has very low permeability. It's tight and therefore we're looking at a well that's probably going to produce at an initial rate of 10 barrels a day or less.

Now, if it does encounter some vertical fracturing, we can look at initial rates probably in the range of 20 to 40 barrels of oil per day.

If it encounters a significant fracture, such as we have with the 11-16, the producing rates are large, in excess -- capacity in excess of 500 barrels a day.

Q Let's -- I will come back with the geologist and spend some time on the cross section and the structure map, Mr. Haddenhorst, but let me have you identify for the moment the structure map in the upper lefthand side of Exhibit A, and ask you about the line of cross section and how it corresponds to the plat on the lower side of the ex-

hibit.

A The cross section line labeled X-X' corresponds to the cross section shown directly below it with the western end of the cross section being 15-4 and the eastern end being 1-16.

Q That portion of the exhibit that shows the cross section, the second well from the left says proposed location --

A Yes, sir.

Q -- we now have the log on that, do we not?

A That is correct.

Q All right, sir. Let's go then to Exhibit B, Mr. Haddenhorst. Let me ask you at this point, Mr. Haddenhorst, if as a reservoir engineer you have reached an opinion as to whether one well spaced upon 320 acres, no more than one well to each 320 acres, can adequately and effectively develop the 320 acres.

A If a well encounters a major fracture system, such as the 11-16 did, it certainly will drain at least 320 acres.

Q Are you familiar with the West Lindrith Gallup Pool, the West Puerto Chiquito Mancos Pool, and some of those other Niobrara producing pools in northwestern New Mexico?

A Yes, in a general way I am with the information I've been able to acquire.

Q Have you -- I'd like for you to describe at this point exactly what you've done as a reservoir engineer to support your conclusion that you believe that one well can effectively and efficiently drain 320 acres.

A I have reviewed in considerable detail the testimony that was presented on West Puerto Chiquito Field, which obviously has a very extensive fracture system and I think the evidence there is conclusive that those wells will drain a large area.

I have analyzed the pressure build-up data that we took on the 11-16 and made some calculations of the theoretical drainage area of this reservoir based on that pressure information, and it certainly would drain at least 320 acres based on that information.

Q All right, sir, let's go through your analysis, then, of what you've done as a reservoir engineer to reach that conclusion, commencing first of all with the PDT summary at the top center of Exhibit B and have you generally summarize what that purports to show.

A We sampled, Gary sampled the 11-16 Well November 1st, 1983. We did this to secure information as to reservoir fluid properties as soon as possible after the well was put on production. The significance of the information on this exhibit, I think, can be summarized in three main points.

First of all, that we measured a saturation pressure at a bubble point for this crude oil of 1037

psi. The initial static reservoir pressure in this well was 1265 psi. So the reservoir is approximately 240 pounds above bubble point.

We measured the formation volume factor and the viscosity of the crude oil and of course the formation volume factor is used in any oil in place calculations. The solution gas/oil ratio was measured so that we know what the gas in solution is when we're producing the wells and measuring the gas, and the solution gas/oil ratio was 340 cubic feet per barrel. The oil viscosity at reservoir conditions was .9 centipoise and it's not shown on this table, but the API gravity of crude oil is 41 degrees.

Q Is this a portion of the standard engineering calculations and data necessary from which to make a calculation of the oil in place?

A Yes, it is. These, you need the PDT properties of your crude oil in order to make any meaningful material balance calculations.

Q All right, sir, let's go then to that portion of the exhibit just below the first block, that's captioned Estimated Primary Recovery versus Well Spacing, and have you describe what you've done there.

A This portion of the exhibit was developed to show the oil in place that we can anticipate within this area, making certain assumptions. The assumptions are average net pay of eight feet and this comes from the analysis of the logs. We find that the pay intervals are thin and

they're tight. Connate water saturation of 25 percent. Formation volume factor of 1.22, which was measured. And then we took a look at what primary recovery could be expected using two cases.

First, an average solution gas drive recovery from a reservoir with -- that does have good reservir properties, or reasonable reservoir properties of about 15 percent.

Q All right, let me interrupt you for a moment. I want to have you explain to us the average solution drive primary recovery number of 15 percent. Is it your opinion that this Niobrara Pool is what is characterized as an average solution drive reservoir?

A No. No.

Q All right, is it above average or below average?

A It's below average.

Q A typical solution gas drive reservoir would have what factors that are different from the factors that you have encountered in this Niobrara reservoir?

A Typical solution gas drive reservoir would have more porosity than we're dealing with here. We're dealing with porosity in the range of four to six percent and solution gas drive reservoirs, where you're expecting reasonable recovery, ordinarily would have porosities at least in the ten to fifteen percent range.

Q All right, sir. You said you've got a

second case study under primary recovery that says Puerto Chiquito estimated six percent. What is the purpose of that?

A In, at least from the information that we have right now, our reservoir could be similar to Puerto Chiquito, West Puerto Chiquito, and Mr. Greer, in his work there, concluded that primary recovery, excluding gas cap expansion and gravity drainage, would be approximately six percent, and looking at some of the other reservoirs in the area, I think that this is the reasonable recovery factor for this type of reservoir.

Q Are you familiar with the percentage recovery factor testified to by Mr. John Roe, the petroleum engineer for Dugan Production Company in the spacing case in November of 1983, concerning the Jerome McHugh application for 320-acre spacing in the Mancos Oil Pool?

A Yes, I believe he used five percent.

Q All right, sir. All right, continue, then, with an analysis for us of this block of information concerning the primary recovery per well.

A Using the two recovery factors previously mentioned, we took at look at recovery for a reservoir with six percent, eight percent, and ten percent porosity versus well spacing, and as can be seen from this table, at the reservoir porosities that we are anticipating, that even with fifteen percent primary recovery on 160-acre spacing, recovery is only 55,000 barrels.

Q All right, let me remember what the porosity number is. What do you anticipate to be the porosity?

A Our porosity that we see from the logs and the core analysis, will be somewhat less than 6 percent.

Q All right. So the case study that represents in your opinion the most reasonable primary recovery assumptions would be the first line of information correlating to the average porosity 6 percent and going across and showing the recovery per well in barrels of oil at the various acreage numbers.

A That is correct.

Q All right, and when you get to 160-acre spacing you anticipate a recovery number of something less than 55,000 barrels of oil.

A That is correct.

Q All right, sir. What happens under Table 2?

A Under Table 2 we have presented the same information in terms of porosity and used an oil recovery factor of 6 percent instead of fifteen percent.

Q All right, the only change then between Table 1 and Table 2 is that in Table 2 you've used the 6 percent recovery factor that you believe more closely approximates what will happen in this reservoir.

A That is correct.

Q All right, sir, and following the 6 percent line, the top line across the table, what happens at

160 acres?

A At 160-acre spacing the recovery is just slightly more than 22,000 barrels.

Q In your opinion can this pool be adequately and effectively developed at an economic profit to the operators at 160-acre spacing?

A No.

Q Let's go through the economic analysis, then, and have you tell us how you support that opinion.

A To develop information on the economics in this area, we made the following assumptions:

First, a completed well cost of $450,000; an annual decline rate of 15 percent per year; a crude oil price of $30.00 per barrel, escalating at 8 percent after two years; local taxes at 8 percent of gross revenue; operating costs of $2000 per well month.

Using these assumptions and varying the initial well rate, we calculated gross oil recovery and the economics of drilling a well with these assumptions.

This shows that if a well starts out making 250 barrels a month, or about 8 barrels a day, that it has no chance of paying out, and that you must get up to over 20 barrels a day, 26 barrels a day, actually, to where a well will pay out and make even a small profit.

Q Tell me something about the Well 11-16 in terms of its initial potentials, something about its history, and its current production rates; some general inform-

ation then about Well 11-16.

A This well was drilled down to the top of the Gallup C interval and it -- the casing, 7-inch casing was set on it on top above the Gallup. and the well was drilled then with air, and the well blew out after it had penetrated approximately four to six feet of the Gallup C.

Q All right, let me ask you this. Why would you drill a well like this with air?

A To protect the formation from damage due to the mud. Every effort has to be made to keeep from damaging the formation, which appears to be susceptible to mud damage, and also, when you are in an area such as this, and particularly the Well 11-16, and you're looking at a well developed fracture system, there's considerable risk of lost circulation and damaging the well with lost circulation material, also.

Q All right, drilling with air, then, you encountered -- what happened?

A Well, actually it was air and -- it's called mist drilling, but basically it is air drilling, and when they drilled into the Gallup C interval, approximately four to six feet, the bit torqued up and the well started to blow out.

Q All right, what is that an indication to you as an engineer?

A Well, it's an indication that they hit an interval with very high permeability or producing capacity

because the well was flowing oil to the surface and had to be killed with oil to control.

Q Is that an indication to you that the wellbore has encountered one of the primary fractures within the fracture system?

A Yes, that's my belief, that it did encounter a sizeable fracture system.

Q When was the well completed?

A It was completed in the latter part of October, I believe, because we sampled it the first of November.

Q Now this is 1982.

A Right.

Q This is a recent well.

A Yes, very recent.

Q What kind of production tests were conducted on the well and what were the results of those tests?

A We conducted a flowing test prior to sampling the well and then shut the well in for a build-up, and based upon this information, as I mentioned previously, the reservoir static pressure is 1265 psi and the well flowed at a rate of 460 barrels of oil per day with less than 50 pounds drawdown.

Q Do you have an opinion based upon your study of the engineering properties of this reservoir why that would not be an indication that this is a reservoir that could be developed on closer spacing than 320 acres?

A Would you restate that question --

Q Yes, sir.

A -- for me, please?

Q Based upon the productivity of this well, what causes you to believe that this spacing for the area around this well, this immediate area, ought not to be closer than 320 acres? It seems to me like a well that produces 460 barrels a day is a pretty good well.

A It is a good well but based upon the properties of this reservoir and the information I previously presented in terms of oil in place, a well has to drain a wider area to recover economic amounts of oil, and this well, based upon the analysis of the pressure build-up curve is draining a large area.

Q Mr. Haddenhorst, what do you anticipate the costs of an average well completed in this Niobrara formation?

A A cost that we have used here of $450,000 is the cost that we're looking at right now. Ultimately, if development continued in there, as we learn more about it, these costs may drop some, but these wells are costly to drill and complete, particularly since you have to set your 7-inch casing above the producing interval, drill then with air, and probably set a liner, or at least in some cases set a liner, selectively perforate and selectively stimulate.

Q Let me ask you something about that portion of the application that deals with the granting of an

allowable for each of the wells.

The application requests an allowable of 320 barrels of oil a day and 160 Mcf of gas a day.

Is that portion of the application based upon opinions and recommendations made by you?

A Yes, it is.

Q All right, what is the reason for that recommendation, Mr. Haddenhorst?

A Well, as I read the current field rules, there is no allowable for 160-acre or 320-acre spacing for wells less than 5000 feet deep.

Q All right, you're looking at the depth bracket allowable --

A Yes.

Q -- in statewide rules.

A That is correct.

Q All right, and a well at this depth is less than 5000 feet, and the table simply goes to, I guess, 40 acres, it shows a 40-acre allowable?

A Yes, 40 and 80 acre allowables.

Q 40 and 80 acre allowable?

A Yes.

Q And what's a 40-acre allowable?

A 80 barrels a day.

Q And the 80-acre allowable is what?

A 160.

Q All right. And after that the table is

blank.

A There's just -- the table is blank, yes.

Q All right, what would you propose to do then for a 320-acre spacing unit?

A I believe that an allowable of twice the 80-acre allowable would certainly be reasonable, and that's what I propose, that the allowable on 320 acres be 320 barrels of oil per day.

Q How does that relate to the 160 Mcf of gas a day limit?

A The 160 Mcf of gas per day was based upon producing the well at 150 percent of the solution gas/oil ratio, and the reason that this proposed is it would at least give us some flexibility if a well did not produce its absolute solution gas/oil ratio, would give us some flexibility with our gas rate, which I think in this area we're going to need in terms of our testing and trying to determine how the reservoir behaves.

Q How does this proposed rule compare to the statewide gas/oil ratio limitation of 2000-to-1?

A At 2000-to-1 the well would be producing far more gas than what we propose.

Q The last proposed rule on the summary sheet is -- concerns some testing information, I believe. What, explain to us how that operates?

A Are you referring to item four?

Q Yes, sir.

A What we propose here is that if we drill a well that we believe encounters primarily gas and is a gas well, that this well be shut in and not produce until engineering evidence can be provided to show that the production of this well will not jeopardize overall recovery form the reservoir.

This was put in there because if in this area we do encounter a gas cap, that is a significant source of energy in producing oil, and if we were fortunate enough to have gas cap expansion and gravity drainage, it is even more important.

Q I've been doing this too long. I lost my train of thought.

A I would like to go over the bottom portion of this graph --

Q All right, let's do that.

A -- on the economics, if I may.

Q Let's do that.

A I kind of left it up in the air. We had talked about the top portion of the graph where we showed economics versus oil recovery, and the bottom portion of this graph is simply a plot of the information derived from the table above, and what this graph shows is that at the highest oil recovery rate from the table above, which is Case Five, 50,900 barrels, that at that recovery, using the other assumptions that we've made, that a well will have a rate of return of less than 20 percent, and in an area such

as this, where the development certainly is fairly high risk, even this rate of return is not adequate.

Q Do you have an opinion, Mr. Haddenhorst, as to whether if this pool is spaced temporarily for this first year period on 160 acres, as Champlin has requested, whether or not that will result in the possible drilling of unnecessary wells?

A Yes, I think that's a real possibility.

Q Why do you believe that?

A Because we know that the 11-16 encountered a significant fracture, or is tied into a significant fracture system of some sort, and if this fracture system continues throughout this area, or even in a portion of this area, that the wells will be able to drain a wide area.

Q Let's look at the west half of Section 11, west half of 11 is not shaded yellow. It's the white area on the plat. The east half of that section is shaded yellow. What is the proposed spacing acreage dedication for a 320-acre spacing for the 11-16 well?

A It's a standup 320. It's the east half of Section 11.

Q So it would not include any of the Champlin acreage.

A That is correct.

Q So the west half of Section 11 would be available to Champlin to drill a well spaced as we propose.

A That is correct.

Q Do you have an opinion as an engineer as to whether there is a reasonable probability that they have an adequate location within the west half of 11 in which to locate a well?

A Based on the information we have, geologic and seismic information, we believe that that is a good location.

Q Where would you recommend to Champlin that they place the well in the west half of 11?

A I think it should be placed in the -- in the 160 -- as far as the actual 40-acre tract in the northwest quarter, I think that's going to depend a bit upon terrain.

Q Somewhere in the northwest quarter of Section 11, then.

A That's correct.

Q If after the first year the Commission changes the pattern back to 160-acre spacing, do you see any adverse consequences on either Champlin or Samuel Gary if additional wells have to be drilled after that time?

A No, I do not.

Q If Champlin's application is granted on 160-acre spacing, are you aware of a way that we can avoid further development of the pool on 160-acre spacing, even if that is not --

A Well, I think once you set that spacing pattern, that 160-acre spacing pattern, that's going ot dic-

tate.

Q Let me ask you something about the 14-4 Well in Section 14 that's noted as a location on the exhibit. Describe that well for us.

A The 14-4 that was shown as a location was the last of five wells that have recently been drilled by Gary, and that's the reason that it has not yet been completed. But that well was drilled through the Gallup interval and has basically the same log characteristics as those shown on the cross section; however, this well did not encounter any significant fracture system.

Q Let me ask you some questions about what's going to happen in this first year period with regards to the development of additional information whereby you could determine as a reservir engineer whether 320-acre spacing is appropriate or not.

A The plans to gather additional engineering information in the area include, and I'll go well by well, on the 15-4 to the west, that well is completed in the A interval and was completed on plunger lift and they have not been able to keep it going on a consistent basis, so that well is currently being placed on beam pumping unit so that we can keep it producing and get some reasonable information.

The 14-4, going to the east, that well will be completed in the Gallup interval.

The 11-16 now is producing from an open

hole interval but the production is coming from about 4 to 6 feet in the C interval.

The 1-16 Well was the well that have been drilled prior to Gary taking over the property. It was completed open hole and stimulated. It was fraced, had an initial rate of somewhere in the range of 40 barrels a day and subsequently filled up with sand and it will be cleaned out and placed back on production.

So that we have, basically, four producing wells from which we can gather information, and we plan to run interference tests between these four wells to see what the connection is, how well they're draining the area.

In addition to that, probably within the year period there will be at least one more well drilled in the area.

Q Mr. Haddenhorst, I realize that you haven't described the geology in detail and I do not intend to ask you questions about specific geologic matters. With that reservation, were Exhibits A and B compiled under your supervision and direction?

A Exhibit B was compiled under my supervision and direction and I participated in the preparation of Exhibit A.

Q Is the information contained on Exhibits A and B true and correct to the best of your knowledge, information, and belief, based upon your study of the well information and the data derived from the study of the area?

A Yes, it is.

Q In your opinion, Mr. Haddenhorst, will approval of Samuel Gary Oil Producers' application for 320-acre spacing be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, it will.

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

We move the introduction of Exhibits A through B.

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

Any questions of the witness, Mr. Carr?

CROSS EXAMINATION

BY MR. CARR:

Q Mr. Haddenhorst, to be sure we're all together on this. You performed an analysis of the reservoir. In performing this analysis did you rely on any seismic information?

A For my engineering analysis, no.

Q That's something that was left for the geologist --

A That is correct.

Q -- to work with. And you reviewed the

transcripts of the hearings for the Puerto Chiquito.

A Yes.

Q And if I understood your testimony, you believe that you have a pool here that may be like to Puerto Chiquito.

A Yes, I believe that's a possibility.

Q So what we're really looking for when we drill an oil well in the proposed area is a chance to connect with this -- with this fracturing system.

A That is correct. Either by the wellbore itself or being able to fracture into a major fracture system.

Q Now, you've drilled, when the well was drilled in the southeast of the southeast of 11, that's the producing well, did you complete that well at the time you drilled it?

A The well, since it blew out, they killed it with oil and they simply put it on production at that time, so it has not been stimulated.

Q I believe you stated that the well you have drilled in the northwest of 14 did not encounter the fracture -- or did not encounter the -- connect with the fracture system.

A That is correct, and I say that because there was no significant fluid entry or bottom hole pressure.

Q And when you complete that well, do you

intend to fracture the well?

A Yes.

Q Is it possible at that time that you could establish communication with the fracture network?

A I think it's a possibility, yes.

Q So that you -- once that well is completed there may be data that would establish the fracture system extends into that area.

A That is correct.

Q Now if I look at this, you've indicated, I believe, maybe I'm getting into the area that should be reserved for the geologist, but there's a trending from northeast to southwest of the basic formation.

A Well, that trend that we show on our map, basically is based upon the well control we have and the area somewhat takes the shape, at least on the south end, of the position of the wells.

Q Do you have any means available to you to anticipate the direction of the fractures in this area?

A No, sir, we don't.

Q None whatsoever?

A We thought we did, but we don't.

Q And what -- you thought you did, what do you mean by that?

A Well, we felt that when we drilled the 14-4, based upon -- and I'm getting into the geologist's area here a little bit, but based upon the seismic informa-

tion we had, we felt that this well stood a good chance of encountering the fracturing system, and it didn't.

Q It hasn't yet?

A The wellbore has not, that's correct.

Q The wellbore, but if once, I think, you fracture, you indicated you might.

A Yes, but the -- the information that we had, we felt that the wellbore itself would encounter the fractures.

Q Now, do you believe that -- so it was your interpretation that the reservoir was so highly fractured that you would probably intercept the fracture system with the well itself?

A No, the interpretation was based upon the seismic information we had, they felt that they could see this fracture trend going in the direction of that location, but in fact it did not.

Q So what you were doing is you were trying to chase a fracture from the first well to the second.

A That is correct.

Q When was the well in 14 drilled?

A Very recently. I don't have that completion date, but it was within, like, the last two weeks.

Q Do you anticipate completing that in the near future?

A Yes. And the reason it hasn't been completed is, as I mentioned, Gary drilled five wells in the

area, this being the last one and they're moving from well to well with their completion unit.

Q And I believe you indicated that your proposed well location requirements would provide for flexibility necessary to intercept these fractures.

A To a certain extent, yes.

Q So if you take a look at Section 11, the closest possible location to the existing producing well would be in the center of the southeast quarter of the northwest quarter, is that correct?

A That is correct.

Q And I may have asked you this, but I'm going to have to ask you again because I can't remember if you answered.

Is there a general trending of the fractures in this area?

A We haven't seen it yet. As I commented previously, we thought we could see this from the seismic, but we have not been able to pin it down yet.

Q With the data you have available, having not completed the 14, you don't know.

A That is correct. We don't know if we can frac into a major fracturing system or not.

Q Don't know if you can.

A Yeah, don't know yet.

Q But the closest you could get would be the center of the southeast of the northwest.

A That is correct.

Q Now I believe you're advocating a 320-acre spacing, if I understood your testimony, it was because you felt the wells could drain this area, could drain 320. Have you staked a location in Section 13?

A I can't answer this question. I think the geologist may be able to but I cannot. I don't know.

Q You have not staked a location there. You don't know, okay, I'm sorry.

A I don't know. You'll have to ask another witness.

Q To be sure I understand your testimony, you now have a log on what's presented on the cross section as a proposed location.

A Yes. The 14-4, the proposed location.

Q And you -- but you did not use that log in making any of the interpretations depicted on this exhibit.

A That is correct.

Q And I believe it was your testimony that that log didn't change anything, is that a fair characterization of that?

A Yes, I believe it is and the geologist, I think, will reinforce that.

Q Now you said that you think that a well will drain 320 acres. You've indicated, I believe, that you don't know what direction that drainage might take, is that

right?

A That is correct at this point in time.

Q Do you anticipate in a fractured reservoir of this nature radial drainage?

A The, I think this depends upon the extent of the fracturing system. I think that if you have extensive fractures that it will approach radial drainage ultimately. Obviously, if you have one single fracture, there's no way you can say it's going to be radial drainage.

Q You wouldn't -- you weren't anticipating radial drainage when you located the well in 14, were you?

A In Section 14? We were anticipating encountering that major fracture system, but here again, I don't believe you can see, well, it is or isn't radial drainage till you have some feel of how extensive the fracture system is.

Q I guess I should talk with the geologist about what causes the fracture system.

A I think that would be prudent.

Q Now, in Section 13, if you -- to go under your proposed rule, you could locate a well in the northwest of the northwest, in the center of that quarter quarter section, could you not?

A That is correct.

Q And in effect you'd be locating wells on what is an effective 40-acre spacing pattern, and that would be permitted by your rules, would it not?

A Under the proposed rules it would, yes. I would say that that would be an -- I would call that an 80-acre pattern, if you did that.

Q Okay, but it would be in the center of two diagonal forties.

A That is correct.

Q Now, I believe you indicated that you think that probably the evidence a year from now will show that 320 is appropriate, the appropriate spacing for the area. Is that -- is that -- my understanding of your testimony was that you felt that 160-acre spacing would probably be inappropriate.

A At this point in time I feel that 160-acre spacing is inappropriate until we can gather additional information from the wells we have to better determine how extensive the fracture system is, because if we do have an extensive fracture system certainly the wells will drain 320 acres.

Q Okay, now, so the wells do drain, you believe, a large area.

A Yes.

Q And you presently have a well in the southeast of Section 11.

A That is correct.

Q And you presently have a well in the northwest of 14.

A A well -- yes, sir.

Q And your rule would permit you to drill a well in the southeast of Section 10.

A In the southeast of Section 10, that's correct.

Q And you would therefore have wells with high drainage capacity offsetting on three sides the southwest quarter of 11.

A That's correct.

Q I believe you testified that by putting the wells in the center of each quarter section that you would have wells located so if you had to reduce the spacing you wouldn't have any well location requirements, is that correct?

A I think it will minimize the problem, yes.

Q And if you had to do that a year from now, you could have been in a situation where you could have drained the southwest quarter from three sides and your wells would have prohibited Champlin from developing that acreage for a one year period of time.

A I think that's true, but I think there's a little more background to it than that.

Q They would only be permitted to develop the northwest quarter, isn't that correct, of Section 11 under your -- your proposal.

A That's correct.

Q And they would be set back from the

southwest, they would have to set back from the southwest quarter the same distance as your well in Section 14 is set back from that acreage.

A Would you run that by again? I didn't follow.

Q If we are to develop in the northwest of Section 11 --

A That's correct.

Q -- we would have to set back a certain distance from the -- the boundary of that quarter section.

A Uh-huh.

Q We would have to be back the same distance that you are back, set back from the southwest quarter of 11 with your well in Section 14.

I mean if we're -- we're looking at this as if we someday revert to 160, and I'm asking you whether or not we wouldn't be offsetting that -- the only thing we could do now would be to offset the southwest quarter of that the same distance that you presently have a well offsetting.

A I'm afraid I'm not quite following you. I'm not trying to be --

Q No, I know that.

A It's a little bit confusing.

Q Okay.

A So, you have -- yeah, right now on your 320 you have the option of putting a well somewhere in one

of the forties in the northwest quarter.

Q Yes.

A Correct.

Q And if we look at just the southwest quarter that would be a 160-acre unit under our proposal.

A Yes.

Q And if your rules were granted, we couldn't get any, closer to that southwest quarter than you were already offsetting that southwest quarter.

A You couldn't get any closer to the southwest quarter --

Q Than you are to it with your well in 14.

A That's correct. Well, now, you'd be -- you, if you were to drill on 160-acre spacing in the southwest quarter and had the option of drilling in the southwest -- in the southeast of the southwest here, your well would certainly be closer than our well in Section 14, which is in the northwest of the northwest. That's what I'm having trouble following.

Q Well, let me give you a hypothetical.

A year from today we've just gone to 160-acre spacing.

A Uh-huh.

Q But in the meantime Champlin under your proposed rules drilled a well in the northwest of Section 11.

A Yes, sir.

Q How close to the southwest quarter could we get? Wouldn't we have to be in the middle of either the southwest of the northwest or in the center of the southeast?

A Well, under our proposed spacing we don't propose that you be in the center of a quarter section. We propose that you be in the center of a quarter quarter section. I don't follow you saying --

Q I'm asking you --

A -- the center of the southeast. I don't understand that.

Q I want you to look at just the northwest of Section 11.

A Okay.

Q All right. Now I'd like you to look at the southwest of the northwest, which is a quarter quarter section.

A Southwest of the northwest, right.

Q Could we not locate a well in the center of the southwest of the northwest?

A Are you talking about the time that we go 160-acre spacing or now?

Q I'm talking right now.

A Yes, you could.

Q And we could also drill one in the center of the southeast of the northwest.

A Center of the southeast of the northwest?

I don't understand, not on --

Q Either -- either one or the other. I'm trying to see how close --

A Yeah, yeah, you can't do them both. Yeah, you could drill one or the other, certainly.

Q And how many feet are we away from the -- from the boundary, northern boundary of the southwest quarter?

A Well, it looks to me like you'd be 660 feet.

Q How far away from the south boundary of the southwest quarter is your well in Section 14?

A South boundary of the southwest quarter, the same distance.

Q So --

A Wait a minute, wait a minute. Our well in the -- in Section 14 from the south boundary? Yeah, it would be the same distance, if it's a regular location.

Q So if we look at just the southwest quarter of 11, under your rules we can't drill any closer to those reserves than you already are located.

A Under current --

Q With respect to them.

A Under current proposed spacing rules that is correct.

Q And we would have a quarter section with three Gary operated wells offsetting it and only one well

operated by Champlin.

A At some point in time I think it's appropriate that we discuss the history of this, as to how this transpired.

Q Well, if Mr. Kellahin wants to do that, he can. We will also review that in a general way.

But it would be a fair statement to say that the reserves under the southwest quarter of Section 11 would be offset or could be offset under your proposal by three Gary wells and only one Champlin well.

A That's correct.

Q And the reserves under 11 are owned by Champlin.

A I beg your pardon?

Q And the reserves under the southwest of 11 are owned by Champlin.

A Under the southwest, yes, that's correct.

Q I'm not trying to mislead you.

A And I have trouble following all these locations.

MR. CARR: I have no further questions.

CROSS EXAMINATION

BY MR. RAMEY:

Q Mr. Haddenhorst, now you've essentially got four wells in the pool at this time.

A That is correct. Three completed and one not yet completed.

Q Okay, the first well on your cross section at X, did that encounter a fracture system?

A It encountered a limited fracture system, and the reason I say that is that the porosity and permeability that we have in here, if a well doesn't encounter some fracturing it's going to make less than 3 barrels a day, probably, from this thin pay section, and that well, as I recall, made about 20 barrels a day, so it encountered some fracturing.

Q Okay, so then the rest of the wells have encountered a fracture system but the No. 11-16 has encountered what you would term an excellent fracture system.

A A major fracture, yes, sir, major fracture, right.

MR. RAMEY: Any other questions of the witness? Mr. Stamets.

QUESTIONS BY MR. STAMETS:

Q Mr. Haddenhorst, I believe you testified that the gas wells should be shut in pending some sort of a hearing showing that they could be produced without causing waste to the reservoir.

A Yes, sir.

Q What would constitute a gas well? What gas/oil ratio?

A I'll have to confess I'm not familiar with how New Mexico defines a gas well, but I would think that, I believe it's what, anything over 100,000 to 1? That's what we would define as a gas well.

MR. STAMETS: That's all.

CROSS EXAMINATION

BY MR. RAMEY:

Q One question, since you brought that up. If a well exceeds a GOR by more than 50 percent --

A Yes.

Q -- that would be 500 --

A That's right, the solution ratio is 340 so it would be approximately 500 cubic feet.

Q Then the well would be limited to 100 Mcf a day.

A That's correct.

Q So if one well had a GOR of 500-to-1 it would get 100 Mcf a day and if a well would have 500 it would get 160 Mcf a day.

A That's correct. What I was attempting to do here was to give us the flexibility to produce these wells and get some good production information on them, but at the same time try to prevent producing undue amounts of gas while we're doing this, and I must say, that there's not any real scientific basis for it, but I thought it would give us the flexibility to do what we need.

Q Thank you.

MR. RAMEY: Any other questions of Mr. Haddenhorst? He may be excused.

MR. KELLAHIN: My next witness has not been sworn. My next witness is Joyce Engelbrechk.

(Witness sworn.)

JOYCE ENGELBRECHK,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Ms. Engelbrechk, would you please state whom you work for and in what capacity?

A I work for Gary Williams, Oil Producer, formerly Samuel Gary, Oil Producer, as a landman.

Q How long have you been so employed as a landman?

A Two years for Samuel Gary.

Q Are you familiar with the general lease ownership in the proposed pool?

A I am.

Q And are you familiar with the efforts that Samuel Gary has made in terms of its dealings with Champlin?

A I am.

Q Let me direct your attention first of all to a concern that Mr. Carr raised with Mr. Haddenhorst. You heard Mr. Carr's question about the possibility that the west half of Section 11, the Champlin acreage, under the proposed pool rules in that first year might be exposed to having three wells offset its acreage. Did you hear that?

A I did.

Q On behalf of Samuel Gary Oil Producers, are you willing not to drill for the first year any Niobrara well in the southeast quarter of Section 10 to thereby avoid offsetting the Champlin acreage on three sides?

A I believe that we can clearly state that we would not drill in Section 10, barring any problems. As far as I'm aware right now, there are no lease expiration problems within the next year in Section 10, and I think we can safely say that we would abstain from drilling in Section 10 for at least the next year.

Q Let me direct your attention to Section 13.

A Uh-huh. May I have a map in front of me, please?

Q Sure.

A Thank you.

Q Mr. Carr asked Mr. Haddenhorst about a possible staked location in Section 13.

A Uh-huh.

Q Are you aware of whether or not Samuel Gary Oil Producers has any staked locations in Section 13?

A There is no staked location in Section 13.

Q All right. You don't have any immediate plans in the next year to drill a Niobrara well in the northwest quarter of Section 13?

A Not that I'm aware of at all.

Q Let me have you describe for us, if you will, in a chronological way, the efforts that Samuel Gary has made to get Champlin to participate in the exploration of this pool.

A Okay. Shortly after the first of last year, 1983, I don't know the exact date, but it was right after the first of the year, I contacted a landman with Champlin to inquire as to the interest of Champlin in joining --not joining but in farming out to us a section of their acreage in the area that we are interested in.

We had originally asked for a large area and were -- we were told that that was too large an area, that we should contract it, so we went back and contracted our area, three times, I believe, a four township, large area, committing to four wells, to a smaller area of four sections to a smaller area of two sections, to a smaller area of one section, and we still did not get any kind of an answer other than sometime around July a respone that Champlin was not interested in farming out to us, that they were

still considering a pool, but we never got an affirmative answer on that, either.

Q What, if any, discussions or dealings did Samuel Gary, to your knowledge, have with regards to the formation of a drilling unit or a working interest unit or a spacing unit for Section 11?

A Just rephrase it, please.

Q All right. You've discussed for us your efforts and contacts to get Samuel Gary to farm out some acreage in the immediate area.

A Uh-huh.

Q What, if any, other contacts did you have or Samuel Gary, to your knowledge, have, about the formation of any other types of participation in the development of the pool?

A We did talk about pooling all of Section 11 and we proposed our location in the southeast of 11 because we were dealing with a lease which was about to expire and we wanted to put our well on that lease and save the lease.

When Champlin and Gary were discussing a pool in 11, my recollection is that they might be willing to pool if we moved the location into the west half, and I believe that my recollection is correct, it was the northwest quarter, somewhere in the northwest quarter.

But we were unwilling to move our location because we wanted to stay on that expiring lease.

Q Thank you.

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

MR. RAMEY: Any questions? Mr. Carr?

CROSS EXAMINATION

BY MR. CARR:

Q You stated that Gary would not drill in Section 10, is that correct?

A In Section 10?

Q Yes.

A That's right. As far as I know, you know, there's no problem with not drilling there.

Q Are you aware if any discussions were had about locating a well in Section 13, to your knowledge?

A No. No, no --

Q And if there had been, would you have known about it?

A I'm pretty sure I would have.

Q I believe your testimony was that you commenced negotiations in early 1983 with Champlin in an effort to develop this acreage.

A Uh-huh.

Q And you were unable to reach an agreement with them.

A Correct.

Q Are you certain that they proposed a well in the northwest quarter of Section 11?

A No, I'm not certain. I'm certain they proposed a change in the location and I believe it was onto the west half, and I thought that it was the northwest quarter, but I could be wrong about that. There's nothing in writing, that was all verbal.

Q Are you aware that Samuel Gary staked a well location in Section 11?

A Yes.

MR. KELLAHIN: In Section 11?

MR. CARR: Yes. They staked a location in the south --

A A new one other than this one?

Q Yes, a second well in the -- filed an application for a permit to drill in the southwest quarter of Section 11? Are you aware of that?

A No.

MR. KELLAHIN: To this depth?

A This Section 11?

Q Yes.

A In the southwest quarter?

Q Yes.

A I'm not aware of that.

Q I'm sorry. I've been running at this as long as Mr. Kellahin.

Are you aware -- are you aware that

Champlin proposed a --

A Yes.

Q -- well in the southwest quarter of Section 11?

A To us, no. They proposed it -- I'm aware that Champlin staked a well in the southwest quarter.

Q And are you aware of any action taken in response to that by Mr. Gary, or by your company?

A I am aware of a conversation with the landman from Champlin, I believe, after our -- this hearing was proposed, about could we do something together, but no action was taken.

Q And you're aware of no action taken by your company in regard to that?

A No, I'm not aware of anything.

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

MR. RAMEY: Any other questions of Ms. Engelbrechk? She may be excused.

MR. KELLAHIN: Mr. Chairman, I'll call my geologic witness at this point, Mr. Bill Stricklin, S-T-R-I-C-K-L-I-N.

BILL STRICKLIN,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is W. D. Stricklin. I'm a consulting petroleum geologist.

Q Mr. Stricklin, have you previously testified before the Oil Conservation Division of New Mexico?

A No.

Q All right, sir, would you tell us when and where you obtained your degree in geology?

A It is now UTEP; was Texas Western, in 1958.

Q I still call it UTEP.

Subsequent to graduation where have you been employed or worked as a petroleum geologist?

A I worked for El Paso Products Company for three years immediately following graduation.

Q And where was that?

A In Farmington, New Mexico.

Q And what did you do for them there?

A I was a petroleum geologist, exploration geologist.

Q All right, and what's your next employment experience?

A Well, it's all been spent in the Rocky Mountains, generally. I've been a consulting geologist for

seventeen years in the San Juan Basin.

Q In the San Juan Basin, and are you familiar with the Niobrara formation of the Gallup Mancos sections?

A Yes.

Q And pursuant to your employment by Samuel Gary as a consulting geologist, have you made a study of the geology, the regional geology and the specific well geology that's developed for the proposed pool?

A Subseguent to working for the --

Q Pursuant to your employment as a consultant?

A Yes. Yes.

Q You've looked at it?

A Yes.

Q All right, prior to that employment, did you have a general working knowledge as a geologist about the Niobrara member?

A Yes.

Q And you're familiar with Mr. Greer's West Puerto Chiquito Mancos Pool?

A (No audible response.)

Q And you have knowledge of the other Gallup Pools in the area that do produce out of the Niobrara member?

A (No audible response.)

Q All right, sir, and you've examined the

various logs for the four subject wells that are involved in the pool area?

A (No audible response.)

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

MR. RAMEY: He is so qualified, Mr. Kellahin.

Q Mr. Stricklin, I don't know where you're most comfortable, if you'd like to sit there and discuss the exhibits or --

A That's fine.

Q All right. Let me direct your attention to Exhibit A, and first of all, to the structure map that's located in the upper left side of the exhibit, and have you generally identify for me what is contained on that plat.

A This is a general structure map constructed on the top of the A zone that reflects the regional dip in this particular area.

Q And what is that general regional dip through this area?

A It's about 150 feet a mile, 200 feet a mile.

Q Were you the wellsite geologist on any of the wells located on the proposed spacing area?

A In the two, I was the wellsite geologist on the 11-16 and the 14-4.

Q All right, let's go to the 11-16 well and

have you describe for us generally the significant geologic occurrences as you identified them during the drilling of that well.

A In the Mancos, or the Niobrara interval, the first show came in the transition zone between the Upper Mancos and the Point Lookout. That zone will produce economic quantities of oil in the Basin proper, in various spots of the Basin proper.

The next show of hydrocarbon came in the A zone. It was a tight, silty sandstone.

The next show came in the B zone. We cored the B zone in the 11-16. The rock is primarily an interbedded, silty, tight sand. The rock did exhibit excellent odor and bright, white, yellow flourescence, with immediately streaming cut.

The next show was a significant show when the well blew in in the top of the C zone.

Q What geologic opinion do you reach with regards to that incident in drilling, insofar as it might relate to the presence of a fracturing system?

A It has to be a fracture system. There's no indication of a reservoir bed of that -- of that magnitude, so it translates to me as a massive fracture system.

Q Would you describe for me generally the geologic characteristics of the Niobrara member of the Mancos Pool, Mr. Stricklin?

A The Niobrara interval is a marine shale.

There were minor oscillations of the sea at the time. It caused cleanups.

In the immediate area those -- those cleanups are not significant. The reservoir rock in the immediate area in the Niobrara interval, Gallup, they are not significant reservoir rocks.

Q Let me ask you about the cross section on Exhibit A, and have you describe generally what conclusion you reached by looking at the logs on those four wells and the cross section.

A This indicates to me there's a continuity of the lithology across the area of interest. There are no surprises. It lays in just like a deck of cards.

Q Let's look at the datum point which is identified as the top of the Gallup B on the cross section. Is that a readily identifiable geologic characteristic in which you can correlate the logs and with some reasonable geologic certainty accurately pick that on individual logs?

A Yes.

Q And is that the datum point upon which these logs are hung?

A I didn't construct this display, but this indicates that the structure is on top of the Gallup A zone. this shows datum on the top of the Gallup B zone. I think that the datum should be taken off or negated.

Q All right.

A The X, the X-X', would, of course, show

the cross section, entire cross section.

Q My point is that you have examined the various suites of logs on these four wells, have you not?

A Yes.

Q And that you can correlate this Niobrara member across the proposed pool as it is identified in each of those logs.

A That's correct.

Q And you find it present, --

A Yes.

Q -- the rock properties present in each of those logs.

A That's correct.

Q And you find and conclude that it is continuous across the wells as depicted on the cross section.

A That's correct.

Q What opinion or conclusion do you reach about the potential extent of the reservoir and its continuity based upon that geologic study?

A It's -- the continuity of the reservoir is established by this cross section. They're practically, the logs are practically overlays, which would indicate that all the lithology in the proposed area would reflect similar logs that we see displayed.

Q Therefore, in your opinion, the proposed boundary of this pool has reasonable geologic correlation to the Niobrara reservoir.

A You would need, to form the pool, you would need some buffer sections around and this pool, it is my understanding that the pool was formed based on the existing wells that were in there at the time, and that's excluding the No. 14-4.

There is a major fracture system in this area. We found it in the 11-16. Now that's what we're all after, is to find that major fracture system.

So, yeah, I would say that the boundaries of the pool are adequate.

Q Now, Champlin, through its counsel, has asked questions of Mr. Haddenhorst concerning Section 11, and the possible location of wells for Champlin within the west half of Section 11.

Do you have a geologic opinion as to where you might recommend as a geologist that Champlin locate the well on their acreage?

A I would -- I wouldn't -- this is just me talking, I wouldn't locate the well close. I'd search in a wider area to see if I couldn't snag that particular fracture system or one of the same magnitude in the immediate area. This is what I would do.

Q Okay, and why would you do that, Mr. Stricklin, I don't understand?

A It's just -- it's economics for one thing. The wells are very expensive down there and if you drill them on close spacing and you miss, then you're going

to have to drill some more until you eventually find it, so step out and see if you can evaluate the area on a larger spacing.

Q You said you were the wellsite geologist on the 11-16 Well, which we've described, and you also said you were the wellsite geologist on the 14-4 Well in Section 14.

A Correct.

Q Would you go back and describe for us the geologic, significant geologic features that you observed in drilling that well?

A The 14-4 didn't have any significant shows with respect to the 11-16. There were shows in the -- in the 14-4 in the A zone, particularly.

The B zone had a little oil in it; mud log showed a little oil with gas, but comparing the two, with significant shows in the Niobrara interval, the 14-4, it was -- is way under the significant shows in the 11-16.

Q Do you have a copy of the log for the 14-4 Well that we might introduce and use in evidence to fill in the blank in the cross section that was prepared prior to that well --

While they're looking for that particular log to discuss, Mr. Stricklin, let me ask you a question about whether or not you see any geologic evidence that would cause you to reach the opinion that one well for geologic reasons could not be appropriately spaced in this

pool at 320-acre spacing?

A Why one well would not be appropriate?

Q Yeah, do you see --

A What, I didn't --

Q Do you see faulting or discontinuity across the proposed reservoir or any other geologic features or factors that would lead you to believe that the wells would have to be spaced on closer than 320 acres?

A No. No.

Q Why don't we do this, Mr. Stricklin, if you wouldn't mind, let's fill in the cross section and have you turn to that portion of the log that is going to correlate with the other wells and don't talk from this yet, just pull them both out.

All right, sir. Correlate us to the Niobrara section, then, in the logs for the 14-4 Well.

A This is our casing point here. It's the top of the A zone as far as to this here. These two electrically resistive blips --

Q You'll have to speak up, Bill.

A Do you want me to start over?

THE REPORTER: Uh-huh.

A Okay. The A zone is here at 3902, correlates with the exhibit, Exhibit A. These two electrically resistive blips correlate to the B zone. This is our C zone, D zone.

Q And you as a geologist can see the

correlation of the Niobrara member --

A Oh, yes.

Q -- in those. It's readily identifiable and it compares to the similar logs of the other wells.

A Right.

Q Is there anything else you'd like to point out about the geologic exhibits?

A Only that the porosity here, as you can see, averages about 5 percent except in a couple of anomalous areas, which goes back to the original engineering about 6 percent porosity, so we're looking at essentially 6 percent porosity in all these wells across here.

Q And that's consistent with Mr. Haddenhorst's opinion that 5 or 6 percent porosity used in his calculations is an appropriate porosity percentage to use.

A That's correct.

MR. KELLAHIN: That concludes my examination of Mr. Stricklin. I tender him for cross examination.

MR. RAMEY: Any questions of Mr. Stricklin? Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q Now, Mr. Stricklin, as I understand it, you prepared this structure map.

A No.

Q You did not?

A It was Gary.

Q That's a company prepared map?

A Right.

Q This is an interpretation of the reservoir?

A Uh-huh, this is a -- the cross section is an interpretation of the way the subsurface lies on the top of the Gallup A zone.

Q Is this, is the shaded area what you represent to be the productive reservoir?

A What I represent to be the productive reservoir. If I was to draw what I consider to be a productive reservoir in this area, I would probably, based on the logs and the information that's available to me, plus the seismic information that I've -- that I've just cursorily seen, I would probably draw it similar to that.

Q Would you put the northern boundary where the northern boundary is on this exhibit?

A I don't know. I don't know where I'd put it. That would take some more -- it would be -- it would be similar to this, yes.

Q Is it possible that it could be slightly to the north of that line if you had done it?

A I can't answer those. I'm not trying to be evasive, because I -- I just saw the seismic information as it went in front of me one day.

Q That's how I've seen the seismic data, too.

A So I'd have to study that in depth and, let's see, but what I did see, I would draw a similar area.

Q Is there anyone here who particpated in the preparation of this portion of the exhibit?

MR. KELLAHIN: Mr. Haddenhorst.

MR. CARR: I thought that was -- if I can just go off the record.

(There followed a discussion off the record.)

MR. CARR: The problem I have with this exhibit is the establishment of the northern boundary and I wonder if Mr. Haddenhorst might, we might be able to recall him in a few minutes and discuss that with him.

It was my understanding earlier that he said this was a geological portion of this exhibit.

MR. KELLAHIN: Mr. Stricklin is here to testify about that. There's no other witness.

MR. CARR: Okay, I just wanted to be sure I had the right witness. I thought there'd be more to it.

MR. KELLAHIN: There's no one else that's going to tell you any more today, Mr. Carr, than Mr. Stricklin is.

Q Mr. Stricklin, can you tell us how the northern boundary of the area that's depicted as the productive interval was picked?

A I can't. I don't --

Q Could you tell me if the northern boundary, if there's anything that would maybe move the south of the northern line?

A If you could get into a study in detail, the seismic information. If I could do that, then I could answer your questions.

Q I understand. I'm not trying to put you in an awkward position. I'm just trying to determine -- if you were able to make that study, you think it would be the same general configuration?

A I would, yeah, I'd make that --

Q But it might vary some ways.

A Yeah, I'd have that opinion, yes.

Q And in doing that you would have to rely on the seismic data.

A I would rely on it, yes. Yes.

Q There are only, what, four wells in this area that you could actually go to for well control?

A No, there are several wells in there. There are those four and then there's a McKay up there in Section 3 that would lend some -- that well --

Q Isn't the McKay -- what's --

A It's not deep enough; that's only a (not

understood) well test.

Q Okay.

A As far as the northern boundaries go, there's no control up there. It's devoid of control.

Q And so at this time it's really hard to say where the northern boundary would be of that accumulation.

A Without specifically seeing the seismic information in there, I'd say that was a true statement.

Q Now, did you have -- have you done any work as to the placing of the contours?

A No. No.

Q If we go from the map which depicts the accumulation and we come down to your cross section, as I understand your testimony, this shows that the rock properties, the portion of the productive interval in terms of the rock properties are present throughout this area.

A Uh-huh.

Q Is that a fair statement?

A That's yes, sure.

Q Now, if I -- are you familiar with the work that Mr. Greer has done in the Puerto Chiquito?

A Yes, not in depth, but I'm familiar with it.

Q And I believe what we're looking for here is -- is a fracture network, is that right?

A Correct.

Q Have you seen any evidence that would show any bending or flexure in this formation either is it depicted in your structure map or on your cross section?

A I haven't done any myself. I haven't done any detailed subsurface mapping in this area.

Q And I'm not trying to get you --

A There are instances not in this particular area but in the overall area down there where there are some nosings. There's some structural nosing in the Basin. There's some faulting in there. So generally speaking, without doing any -- any detail work myself, to answer your question I would say yes. This area is one of a highly fractured character.

Q What causes those fractures?

A It's tectonic movement in the subsurface.

Q When you say tectonic --

A Say tectonism.

Q Is a flexure in the --

A Flexure, right.

Q -- in the formation a tectonic --

A The crowding of this -- of this mass against this mass and you cause fractures in the subsurface.

Q Where you have a bend in the -- in the formation, is that where you anticipate your fractures?

A A bend caused by, I don't want to get too involved here, in this area you wouldn't be looking too much at bends. You'd be looking more at faults and faults equate

to fractures.

Q So unlike the Puerto Chiquito, you're looking for faulting here not bending of the formation.

A Now, the -- the main portion of the Puerto Chiquito Fields is on a nose, a structural nose that dips into the Basin; however, most of the oil that's been recovered in that area has come from the Canada Ojitos Unit, which has no -- no structural flexure at all.

Q There's no structural flexure in the Canada Ojitos.

A It just lays in there.

Q And then if you take a look at the contours running cross the structure map you would again -- would you see any flexure in that area, looking at the structure map that we have on the --

A No. No.

Q So to the extent that neither this nor the Canada Ojitos have any -- is it your testimony that neither of them would have any flexure and that they're similar in that regard?

A You're trying to get me to say something --

A Well, --

A -- that I don't know the answer to.

Q Okay, then that's the answer, that you don't know.

A Okay. If I -- if I had done some detail

work here I could answer your questions, but I can't.

Q Okay, and if you don't know, that's the honest answer, and that's all we can have.

Now, if we have a fractured system here, if I understood the testimony, we need some flexibility to attempt to intercept a fracture network, and I think it was you who testified that what you would do then is you would step out from where you originally encountered the fracture.

A Right.

Q And when you drilled a well in Section 14 you were trying to step out and do that, is that correct?

A I don't know whether that well was drilled to hold acreage. I don't know -- I wasn't -- I was the wellsite geologist, period, so I'd have no background on why that well was drilled there.

Q And yet under the proposed Gary rules the closest we could get, if we were trying to step out and drill a well in the west half of 11, would be in the center of the southeast of the northwest.

A That's right.

MR. CARR: I have no further questions, thank you.

MR. RAMEY: Any other questions of Mr. Stricklin.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Stricklin, do you know whether or not any of the Samuel Gary wells were drilled based upon seismic picks, seismic data?

A I would suppose that they were.

Q In order to adequately define the extent of the reservoir as it moves to the north and west you would have to drill some additional wells, obviously.

A That's correct.

Q And until we do that and develop more data all we have is the present data.

A Uh-huh.

Q And the present data, in your opinion, causes you to believe that the continuity of the reservoir is such an extent that the outline of the proposed spacing area is a reasonable one.

A That's correct.

Q You, as a geologist, I'm sure, are also aware that seismic information sometimes does not lead to the drilling of economic wells.

A Right.

Q And that an operator that uses seismic information to predict the potential extent of a reservoirs, or its existence or occurrence, can be fooled.

A It's a crap shoot.

Q Yes, sir. As a geologist, would you rely

upon seismic information alone from which to at this point project the extents of this particular reservoir?

A No. You mean just rely on seismic information?

Q Yes, sir.

A And disregard the well information?

Q Yes, sir.

A No, I wouldn't, not at all.

Q What does seismic information tell you?

A Well, the seismic would show trends in the subsurface, where fracture systems and faults, and/or faults, may be, may exist. You'd find inner sections of the seismic data that would indicate possibly an area where there was some fracturing and they would be spots where you would definitely look.

Q Seismic information would not tell you whether there was significant faulting in an area to serve as a boundary for the reservoir?

A It wouldn't.

Q Wouldn't indicate the sealing nature of a fault? It may or may not indicate the occurrence of sufficient fracture system and thereby the potential extent of the reservoir? You've got to drill some wells, don't you?

A Right.

MR. KELLAHIN: Nothing further.

MR. RAMEY: Mr. Carr.

RECROSS EXAMINATION

BY MR. CARR:

Q Were you saying that you don't believe seismic is a valuable tool?

A No, I did not. He asked me if I would use it exclusively and disregard well information.

Q And I believe he also asked you to state whether or not using seismic data would necessarily result in the drilling of economic wells and you said no, it was a crap shoot.

A Right.

Q Well, when you do structure maps with well data don't you often run into wells that aren't economic?

A Sure.

Q Again it's sort of a crap shoot.

A Yeah.

Q You use the best tools available to you, is that correct?

A All of the information that I can get my hands on.

Q You wouldn't discount seismic, would you?

A Oh, no.

Q If you were trying to evaluate?

A Oh, no.

Q Have you used seismic to --

A Yes.

Q -- help you to confirm --

A Yes.

Q -- your interpretation?

A Yes.

Q And if you didn't have any well data would you use seismic in interpreting where a reservoir might -- might pinch out or not?

A Well, that would be kind of a -- if seismic information was all I had and it proved to be applicable in an area, then I might present the thing strictly with seismic data and make references to a surrounding area and get a well drilled, yes.

Q If it --

A If I had nothing else.

Q And seismic data would help you determine if there was a fracture system or faulting in the formation.

A It would help you determine if there was indication.

MR. CARR: That's all I have. Thank you.

MR. RAMEY: Any other questions of Mr. Stricklin? He may be excused.

Did you want to recall Mr. Haddenhorst?

MR. CARR: No, not at this time.

MR. KELLAHIN: Mr. Chairman, that concludes our direct case.

MR. RAMEY: Let's take a ten minute recess.

(Thereupon a recess was taken.)

MR. RAMEY: The hearing will come to order.

You may proceed, Mr. Carr.

MR. CARR: Yes, we'd first -- may it please the Commission, we are not going to call our land witness.

We'll call our geologist, Mr. James.

BRUCE JAMES,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Will you state your full name and place of residence?

A My name is Bruce James. I reside in Denver, Colorado.

Q Mr. James, by whom are you employed?

A Champlin Petroleum.

Q In what capacity?

A As an exploration and development geologist.

Q Have you previously testified before this Commission or one of its examiners?

A No, I have not.

Q Would you please summarize your educational background for the Commission?

A Yes. I attended Brigham Young University and received a Bachelor of Science degree in geology in 1976 and attended Brigham Young University, also, and receive a Master of Science degree in 1979.

Q And what have you done since 1979?

A I was employed by Exxon Corporation in Midland, Texas, for three years as a development geologist. I am currently employed with Champlin as a development and exploration geologist and I've been with them for the past two years.

Q Are you familiar with the acreage that is involved in both of the applications here today?

A Yes, I am.

Q And have you made a study of the area?

A Yes, I have.

MR. CARR: We would tender Mr. James as an expert geologist.

MR. RAMEY: He is so qualified,

Mr. Kellahin -- Mr. Carr.

Q Would you briefly state what Champlin seeks with this application?

A Yes. What we seek is the creation of new Mancos oil pool with special pool requirements and special location requirements with 160-acre spacing.

Q Have you prepared certain exhibits for introduction in this case?

A Yes, I have.

Q Would you refer to what's been marked as Exhibit Number Two and explain what this is and what it shows?

A Yes, I will.

I'll turn the projector on. Okay.

Q Mr. James, would you first note what the actual boundaries for the area --

A Yes, the --

Q -- are?

A -- actual boundaries, as indicated previously, would be a straight line down here in Section -- Township 20 North, Range 2 West, including Section 18 rather than 8, to conform with the requested same area.

Q What does -- what is the purpose of this exhibit?

A This exhibit indicates the acreage position of Champlin Petroleum within the spaced area. The

shaded in areas are acreage which Champlin with its partners owns 100 percent.

Q Now you've stated that you conducted a study of the geology in the area?

A Yes, I have.

Q On what did you rely in making that study?

A That study was based on correlations of well logs which we have available in this area. It was also based upon coordination efforts with the geophysicist, also in this area.

Q Do you have an exhibit which shows the result of your geological study and interpretation?

A Yes, I do.

Q Is that what has been marked as Exhibit Number Three?

A That's correct.

Q Would you please review that?

A This is Exhibit Number Three. I'd like to call your attention first of all to the -- to the numbers which you'll see beginning with Number 730 in the lower -- excuse me, 739 in the lower lefthand corner, a series of numbers trending east, west to east across this display. Every one of these numbers is indicative of a shot point used in making a seismic survey of the area.

You'll also note other seismic lines indicated moving to the north, also trending west/east, at

various intervals on this display.

There are also some lines which trend in a diagonal manner, as indicated by my pen, which are additional seismic lines.

Q These diagonal lines run basically northeast/southwest.

A Yes, these diagonal lines are basically northeast/southwest, that's correct.

Q And those are -- indicate where shot points were.

A That's correct.

Q Now would you please explain to the Commission how you went about constructing this structure?

A Yes, I will. First of all, correlations were made off of the well logs which we have available in this area and coordination was made with the geophysicist who I assisted in making this -- what we're calling a structure contour map.

The lines that you see on here are indicative of a common stratigraphic interval in the subsurface. The manner in which this data is compiled is everywhere you see a shot point a seismic time is calculated, which is done by the geophysicist. Once the geophysicist calculated the seismic time to a given interval for each of these shot points, I coordinated with him with the well logs we had in the area and we picked which we felt was a representative horizon for the Gallop formation on the seismic lines and

contour by contour I aided the geophysicist in preparing this structure contour map, which is a representation of the structure on top of the Gallup formation.

Q And who placed these contours? Did you or did the geophysicist?

A Yes, I did, with the geophysicist. We both worked --

Q You worked together on it?

A We worked together.

Q Is this your work product?

A Yes, it is.

Q And what basically does it show?

A What this structure contour map shows is basically the trend of the subsurface structure on the top of the Gallup formation in this area.

Now, I'll simply call your attention to the close spacing of some of the contours, such as over here in Section 6, and how as one moves to the southwest these contour lines in some places remain closely spaced and other places remain further apart.

Based on the information we have from the seismic time, we feel we have very good control to indicate the placement of those contour lines.

Q And is developing a map where you have limited well data by using seismic a practice which is used by your company?

A Yes, it is.

Q And is this a procedure which you believe to be commonly used in the industry?

A It certainly is.

Q Were Exhibits Two and Three prepared by you?

A Yes, they were.

MR. CARR: At this time we would offer Exhibits Two and Three.

MR. RAMEY: Exhibits Two and Three will be admitted.

MR. CARR: And that concludes my examination of this witness.

MR. RAMEY: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. James, tell me something about the seismic information in terms of who made the actual -- who conducted or what company actually conducted the seismic work and when that was done.

A Filon Exploration shot the seismic lines in 1975. This information was available on the market, which Champlin subsequently acquired.

Q And that was seismic work that was done in 1975?

A That's correct.

Q Do you mean to conclude as a geologist

that the northwest quarter of Section 11 would not be productive in the Niobrara member of the Gallup?

A That would be the inference one would draw; however, I would like to refer further questions regarding that to our engineer, who has further data to substantiate that.

Q Well, I think I understood you to reach the geologic opinion that the stippled area, or the dotted area on the postulated field outline --

A We're not prepared to discuss that at this point. Could I please postpone that?

MR. CARR: Mr. Kellahin, that will be reviewed by the engineer.

A I do not have that on this overlay. That's a subsequent overlay, where that stippled area occurs.

Q I'm sorry, I was looking at Exhibit Two and you have not discussed Exhibit Two -- Exhibit Three in this area?

A That should be Exhibit Five. I have not discussed Exhibit Five.

Q I'm sorry.

MR. CARR: Mr. Kellahin, Exhibit Two only showed the acreage that Champlin has in the area.

MR. PEARCE: I'm not sure that we have a paper copy of Exhibit Two for our file.

Q I'm going to show you what is marked Exhibit Two.

A Okay.

Q That has submitted by Mr. James on it, and show you if this is the same exhibit that you've just testified from?

A No, it is not, because what I have testified from is this exhibit, or Two, right here, which only shows Champlin's land.

Q All right, sir, now put the overlay on it.

A This is Exhibit Three with the structure.

Q That's the Gallup structure overlay.

A That's correct.

Q This is Exhibit Three. This is what you have testified from.

A That is correct.

Q All right, let me ask you questions about this one.

MR. RAMEY: My Exhibit Two and Five are the same.

MR. CARR: We will supply a new Exhibit Two which confirms -- looks like it is presented on the screen by Mr. James.

MR. RAMEY: Thank you, Mr. Carr.

Q Everybody agrees, I assume, Mr. James,

including you as a geologist, that we lack adequate well control in this reservoir as we move to the north and to the west. There's just nothing there for us, is there?

A I would not say there is nothing. There is limited information.

Q Okay. Based upon coordination with seismic data you have prepared the Gallup structure map that's shown on the screen there.

A That's correct.

Q All right, I've lost track as to the conclusion you've reached from that analysis. What was it?

A The conclusion we have reached, which our engineer will delve into in more detail, is that there are some trends delineated by the seismic which indicate to us varying rates of dip on the Gallup formation, or a member.

The amount of relative dip is indicated by the closeness of contour lines. Where the contour lines are closer it's indicative of a higher rate of dip; where they are further apart, it's indicative of a lesser rate of dip.

Q As we move up into the northwest quarter of Section 11 we will be down dip from the southeast quarter.

A That's correct.

Q So a well located in the northwest quarter of Section 11 would have structural advantage over a well located in the southeast quarter.

A Northwest?

Q Northwest as opposed to the southeast.

A Of Section 11?

Q Yes, sir.

A But what do you mean structural advantage?

Q It will be down structure from the well located in the southeast quarter.

A It will be down structure, that is correct.

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

MR. RAMEY: Any other questions of Mr.James? He may be excused.

MR. CARR: At this time I would call Robert Butley.

ROBERT A. BUTLEY,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Will you state your full name and place of residence?

A Robert Butley, Littleton, Colorado.

Q By whom are you employed and in what ca-

pacity?

A Champlin Petroleum Company, Division Engineer, Pacific Division.

Q Have you previously testified before this Commission or one of its examiners?

A No, I haven't.

Q Would you review your educational background for the Commission?

A I have a Bachelor's degree in mechanical engineering from the University of Michigan in 1977.

Q Since graduation would you review your work experience?

A I started working for Shell Oil Company in New Orleans, Louisiana, in 1977, as a production engineer.

I attended their extensive graduate program in petroleum engineering, which involved approximately six months of petroleum engineering training.

I worked on several oil and gas fields on the Gulf Coast area.

In 1980 I went to work for Champlin Petroleum Company, also as a petroleum engineer, and I've worked on extensive oil and gas producing fields west of Nebraska, including offshore California and North Slope Alaska, and I am currently supervising four engineers and two engineering assistants in the effect that they are also evaluating reservoir production and economics for Champlin Pet-

roleum Company.

Q Are you a member of any professional organizations?

A I'm a member of the Society of Petroleum Engineers.

Q Does your current area of responsibility for Champlin include northwest New Mexico?

A Yes, it does.

Q Are you familiar with the application filed in this case on behalf of Champlin?

A Yes, I am.

Q Have you conducted a study of the Mancos oil pool in this area?

A Yes, I have.

MR. CARR: We would tender Mr. Butley as an expert witness in petroleum engineering.

MR. RAMEY: So qualified, Mr. Carr.

Q What information did you study in evaluating the Mancos formation in this area?

A I'll reiterate, first of all, that there's not much data available, so what I did study was the available well data which Champlin had access to. I reviewed technical papers and journals that were written on similar type producing reservoirs, and I've also read some transcripts on previous Mancos oil pool spacing hearings before this Commission.

Q Have you reviewed the transcripts on the Puerto Chiquito and Canada Ojitos Unit?

A Yes, I have.

Q Have you reviewed the seismic work that was prepared by Champlin?

A Yes, I have.

Q What conclusions, generally, about the Mancos in this area have you been able to reach?

A Generally that the -- the fracture trends would most likely lie in the northeast to southwest direction; that the fractures are oil productive; and that there may be minor fracture trends lying perpendicular to the northeast/southwest that would have limited contribution to a well's productivity.

Q Would you refer to what has been marked as Exhibit Number Four, Champlin's Exhibit Four, and identify this and review it?

A This is a paper entitled Fractures in Cretaceous Rocks from Selected Areas of the San Juan Basin, New Mexico, and Exploration Implications. It's an AAPG bulletin that was published in April of 1979.

Generally it deals with the -- where you might expect to find fractures and specifically refers to the Verde Field and the West Puerto Chiquito Field's production and reservoir characteristics.

Q Is one of the authors of this paper Al Greer?

A Yes.

Q And what does AAPG stand for?

A The American Association of Petroleum Geologists.

Q Is this one of the documents you relied on in making your study of the area?

A Yes, this and others.

Q And was -- did you use data from this document in trying to determine what the drainage pattern might be?

A Yes, I did.

Q Is this a reliable source of information, in your opinion?

A In my opinion it is.

Q Is this the type of data that a petroleum engineer would rely upon in making this kind of a study?

A Yes.

Q What kind of a drainage pattern would you anticipate in this area?

A I would expect it to follow the fracture trends of the northeast/southwest direction.

Q Have you prepared an exhibit which shows your projection of the limits of the subject oil reservoir?

A Yes, I have.

Q Would you please refer to what has been marked as Exhibit Number Five and review that for the Commission?

A If I may, I'll stand up in front of the screen?

MR. KELLAHIN: Is this the real Exhibit Five?

A This is Exhibit Five. This is what we call the Postulated Field Outline.

What I'd like to explain is how I arrived at this particular outline.

Using the information available on how fractures might occur within a reservoir such as this, the general implication was fractures will occur in the areas of the maximum rate of change of dip; now that being visually taking a piece of rock, regardless as to what dip it currently is at, and changing that dip in such a manner as to fold it or crack it, and we expect that those fractures would lie parallel to the lines of strike of this structure.

The upper and lower limits that I've outlined on this postulated field outline lie in the areas where, as was testified previously by our geologist, the spacing between -- the contour spacing between the lines is changing from a particular spacing or particular rate of dip to something wider, or in this case indicating that you have a rate of change of dip, and I'm saying that the rate of change of dip going in the southerly direction here stops at about the contour on the seismic time of about 735 milliseconds.

Going to the north you have almost the

same, identical situation as is shown to the south, where you have now the wider spacing contours becoming narrower spaced; therefore, a change of rate of dip is occurring at that point in time, and this is at approximately the 765 millisecond contour.

On the east and west sides of the postulated field outline I've used the well data that we had available to us in the area.

This well up here, which on our map is indicated the Lewis No. 2, I believe the name has changed now to the San Isidro 1-16, which is shown on Sam Gary's exhibits and part of his cross section, from our information on this well it roughly has a 20-barrel a day producing rate, and then we've ended the field outline on the western half of the postulated outline based on some PI data we have that indicated the well we have marked on our map as the San Isidro and I can't quite read that, can you help me, I think that's 15-1 --

MR. KELLAHIN: 4.

A -- 15-4 Well, the information we have is that is roughly about an 8 barrel a day IP, and was testified previously, if you're not in the fractures you would expect an 8 to 10 barrel a day rate. Therefore we feel that this is the ends of the field limits.

Q Do you anticipate that a commercial well could be drilled within the area that you have stippled the drop shaped --

A Yes, we expect that this is the limit of the fractured reservoir and within the fractured reservoir we might expect well rates in the range of 100 to, perhaps, 200 barrels a day.

Q What conclusions can you reach about the (inaudible)?

A Excuse me, I couldn't hear.

Q What conclusions can you draw from this about the field?

A Basically, that the fractures lie only within our postulated outline; that the drainage radius would be heading northeast/southwest direction, and that our southern half of the -- that the southwest quarter of Section 11 is in fact productive, as we've shown it.

Q How would you evaluate the chances of drilling a commercially successful well in the northwest quarter of Section 11?

A As we can see on our map here, the postulated field outline does not extend into the northwest quarter of Section 11, and the reason being is that the contours, as our geologist and geophysicist have shown them to be, are parallel and closely spaced; therefore, because of the literature that I've read saying that if you have a constant rate of dip and no change of rate of dip in the rock, we wouldn't expect that to be fractured; therefore, I don't believe the fractures extend into this north half of the -- of the south -- the northwest quarter of Section 11, and

therefore the chance of us getting a commercially productive well in there are nil.

Q What would be the effect of granting Samuel Gary's application, in your opinion?

A Basically, if Sam Gary's application is approved, as we've shown the field outline, we could not have a drainage point in this pool.

In addition to that, being that we feel that the productive areas do extend into the southeast of Section 10 and are also, perhaps, in the well that is in the northwest of Section 14, that Sam Gary could, in fact, drill a productive well on the west side of our southwest quarter. He already has a well to the south of us and to the east of us. Therefore, those three wells should be able to drain entirely our southwest quarter of Section 11.

Q What effect would this have on your correlative rights?

A Well, our correlative rights in that case would be denied and we would not be allowed to produce our share of the reserves from the pool that we have defined.

Q Now Champlin has recommended development of this area on 160-acre spacing. What is the reason or the basis for that recommendation?

A Well, the reason is exactly as Sam Gary has stated before. It's the flexibility needed to be able to chase these fractures and to drill within the pool as we feel the fractures exist.

The effect would be that if we could not drill in what we feel is the fractured area of the reservoir, we would have a noncommercial well.

Q Have you reviewed the economics of developing on 160-acre spacing?

A Yes, I have.

Q Have you prepared an exhibit in that regard?

A Yes.

Q Would you please refer to what's been marked as Exhibit Number Six and review this for the Commission?

A This is an exhibit which shows Champlin's impression of what the economics would be of drilling a well in this area.

It shows that we would require a minimum of 60,000 barrels of oil to have a commercially productive well.

In my analysis of 160-acre spacing in this area, we believe the most likely production would be on a conservative side in the range of 80-to-100,000 barrels of oil, which would certainly make it economic for us to drill on 160-acre spacing.

Q Champlin also recommends a well location requirement of 330 feet from the boundary of any 160-acre tract. Would you explain Champlin's reason for requesting those well location requirements?

A The reason for that is to once again allow the flexibility to drill a well where we feel the fractures exist.

This 330 offset would allow a much larger window within the 160-acre area for placement of a well. It would also protect an operator from drainage in the case where they needed to drill within their section within the fractures to drain their acreage in that area.

Q Would you now refer to what has been marked for identification as Exhibit Number Seven, identify this, and review it for the Commission?

A Okay. This is a report entitled Oil and Gas From Fractured Shale Reservoirs in Colorado and Northwest New Mexico. It's by William Mallory of the United States Geological Survey and was written in 1977.

Q Does this report discuss the subject area?

A It does discuss fractured shale reservoirs in the San Juan Basin and in Colorado. It deals with many different types of fractured shale reservoirs.

Q Did you base any of your conclusions on the area from your study of this report?

A Yes, I did. Page 22 of that report indicates an exploration and completion practice that is recommended in pursuing fractured shale reservoirs and it states basically that you can't plan on a routine spacing pattern in a fractured shale reservoir if you're going to chase the

fractures.

It also states on page 23 the estimated recoverably oil in place. It indicates that in a fractured shale reservoir the only way to know what type of reserves you're going to have is to cite past performance or rely on an analogy.

Q What would be the effect, in your opinion, of granting Champlin's application?

A Champlin's application would allow, in our opinion, optimum drainage of the reservoir. It would allow more wells to be drilled in the reservoir. The analogy to that is that it would allow increased recovery due to more drainage points.

It would prevent waste due to increased recovery.

Q What would be the result of granting Gary's application in regard to waste?

A Well, the exact opposite to what I just said on our application. It would be that you would have less drilling in the reservoir; therefore, less total production, and therefore waste of potential reserves and in addition to that, it would deny us our correlative rights to produced the reserves under our southwest quarter.

Q If Mr. Gary's proposal were granted on a temporary basis, what impact would that have on you?

A Well, the impact would be that we would most likely be drained in the time that it would take to get

the spacing changed, especially if they were to drill a third well to offset us.

Q Were Exhibits Four through Seven prepared by you or compiled under your direction?

A Yes, they were.

MR. CARR: At this time we would offer Exhibits Four through Seven.

MR. RAMEY: Exhibits Four through Seven will be admitted.

MR. CARR: That concludes our direct examination of this witness.

MR. RAMEY: Any questions of the witness? Mr. Kellahin.

MR. KELLAHIN: Mr. Chairman.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Butley, you said that you examined the seismic information that we've heard your geologist discuss and that you also examined well data that was available to you in the area to determine what your opinions would be.

What well data did you actually examine?

A We have the well data in what we have called the Lewis No. 2 Well, located up here in Section 1.

Q All right, sir, let's take them one at a time. That well, I believe, you told me produced 20 barrels a day out of the Niobrara.

A That's correct.

Q All right, you've looked at the well information from that.

A Yes.

Q What's the -- any other wells that you've looked at?

A The only other well that we have data on is this well here in Section 15, which is the San Isidro No. 1.

Q All right, sir, we've referred to that, I think, as the 15-4, but we're looking at the same one. That's also a well that I believe you've told me produces 8 barrels a day out of the Niobrara.

A To our information, yes. We have only the PI information on that, the public record.

Q Both wells are outside of the stippled area that you've postulated as being the field outline for this field.

A That's correct.

Q Okay, notwithstanding the fact that they both produce oil from the Niobrara member that correlates to the same producing interval within the field itself.

A That's correct. I might add that we're talking field in engineering terms is different from geological or exploratory terms and that I deal with economically recoverable reserves and not just the presence of oil.

Q The northwest quarter of Section 11 is a

portion of Section 11 that you feel would not be economic.

A That's correct.

Q Would you recommend to your management as a petroleum engineer that they farm out that acreage as being potentially nonproductive to Samuel Gary?

A No.

Q I believe you've indicated to us the examination of the seismic information and your other data caused you to believe that the fracture trend would follow the parallel lines of the structure. In other words, running from northeast to southwest.

A That's correct.

Q Did you hear Mr. Haddenhorst's testimony earlier this afternoon that he felt that their 14-4 was drilled at its location in an attempt to find that same fracture trend as it runs from northeast to southwest.

A That's correct.

Q All right, sir, and that's the premise upon which you have also postulated the field.

A That's correct.

Q All right, and you also heard Mr. Haddenhorst testify that they did not encounter the fracture in their efforts to drill on a parallel strike with the structure.

A I understand that the wellbore did not encounter the fractures, the wellbore being 7 inches in diameter.

Q Is it possible that the secondary fracture systems in the reservoir can run perpendicular to the structural contour lines?

A Yes. I would consider those minor in respect to the main fracturing trend and most likely would contribute very little in the form of commercial production to a well.

Q And until we drill a well in some portion to the northwest of your limits of the postulated field we are not going to know what the economic productive limits of the well are actually going to be, is that not true?

A That's true in any case, but generally when we drill a well, we'll drill a well based on the best data we have available and our data says that area is not productive. Therefore, I would not -- I can say that Champlin is not prepared to drill a well in the north half of that section right now.

Q All right, sir. Thank you, Mr. Butley. I have nothing further.

MR. RAMEY: Any other questions of the witness? He may be excused.

Anything further, Mr. Carr?

MR. CARR: Nothing further. I have a closing statement.

MR. RAMEY: Mr. Kellahin, do you have a statement?

MR. KELLAHIN: Yes, Mr. Chair-

man.

MR. RAMEY: You can go first, I guess, Mr. Carr.

MR. CARR: Thank you, Mr. Ramey.

I think it's important to remember that the statutory duty of this Commission is to prevent waste and protect correlative rights, and as you know, correlative rights is defined as affording an interest owner the opportunity to produce their just and fair share of the reserves under a tract, under their tract.

Let's look at the Gary proposal. I think all parties have admitted there's really little data available in terms of the extent of the reservoir. We submit that they have shown virtually nothing that would establish how their proposal would actually prevent waste.

We submit, on the other hand, it shows that -- the evidence shows that waste will occur. Their proposal will limit the flexibility of operators, in terms of being able to locate wells in the pool, and if these wells are drilled and cannot, because of the reduced flexibility, intercept fractures oil will be left in the ground and we submit that there is a real risk here of underground waste.

It's very clear that although there's a question on whether or not -- on the waste question, that their proposal would clearly impair correlative

rights. They would like to limit development to one well to each 320 acres; that they propose that these wells be located in the southwest -- southeast quarter or in the northwest quarter.

Well, as we've shown, where the flexures run from the northeast to southwest, if you keep that point in mind, and if you look at the present stand up dedication of the acreage in the spacing unit in the east half of Section 11, and you hold that up against their proposed rule, what, in effect, they do is simply space Champlin out of the pool. They have a well immediately offsetting the southwest quarter of 11 to the south. They have a well offsetting it to the east, and even though they've represented today they do not have plans to develop to the west, that option would be available under the rules which they propose.

We believe that this kind of a situation, the only place we could go and drill is in the northwest quarter of Section 11, which we believe is -- would be nonproductive. We believe this situation simply denies Champlin the opportunity to produce the reserves under the southwest quarter of Section 11, and by everyone's interpretation there are commercial reserves under the southwest quarter of Section 11.

Gary has proposed 320-acre spacing but if you really look at their rules it would permit drilling on diagonal forties and it's either de facto

40-acre spacing or it's de facto 80-acre spacing, and we simply believe it's an unreasonable limitation to impose on the wells in this area right now in an area where there is really relatively little data.

We believe that granting their application would authorize drainage from our tract; that it would deny us the opportunity to offset this drainage with counter drainage and we submit that under your statutory directive you cannot do this.

We believe you have no alternative but to deny the application of Samuel Gary on the record made before you here today.

If we look at Champlin's application, all we are seeking is 160-acre spacing. We believe that this would permit prudent and economical development of the area; that it would result in the increased recovery of oil and would not impair the correlative rights of any interest owner in this pool.

We believe that application should be granted. We simply are before you today as the owner of acreage on which we believe we can drill a commercial oil well. We are prepared to forward immediately and dirll that well and we ask that you do not deny us the opportunity to produce these reserves.

MR. RAMEY: Thank you, Mr. Carr.

Mr. Kellahin.

MR. KELLAHIN: Mr. Chairman, we've presented you with a classic case requiring temporary spacing. It is virtually impossible, as the Commission knows, to conclusively establish what the approppriate spacing ought to be. That only occurs after you've drilled too many wells.

The whole purpose of the temporary spacing rules, and some of them are spaced for a temporary period of up to three years. We're asking for one year, and the whole point is to give the operators in that pool a one year opportunity to conduct further information to thereby avoid drilling of unnecessary wells and cause de facto spacing on the closest statewide spacing available.

We've done these type of cases time and time again and the only prudent and reasonable thing to do in these cases is you set forth some requirements that maintain the status quo and allow those operators that choose to drill wells, such as Samuel Gary, to develop further information from which to conclude whether the wide spacing on 320's is appropriate.

We have proposed at the hearing today some additional factors that we think ought to alleviate any anxiety over the correlative rights of Champlin.

We propose, and are willing to have the order stipulate, that during the temporary nature of the field rules, that Champlin will not cause the drilling of a well in the southeast quarter of Section 10.

In addition we are willing to stipulate and have the order show that Champlin will not cause the drilling of a well in the northwest quarter of Section 13.

The whole purpose is not to surround Champlin and drain their acreage for a year. The intent is to keep these four wells in a situation where the engineer can develop data to determine what the appropriate spacing is and that should it determine after one year that 160's is appropriate, then we're in a position where we can go back and infill or change spacing -- change the spacing pattern.

We believe that there is adequate evidence at this point to demonstrate that there is good continuity across the projected area. Mr. Butley's own ehxibit demonstrates that he has excluded wells from the field area for his economic reasons, but excluded wells from both ends of the proposed pool area that do produce oil from the Niobrara member.

One well, admittedly, only makes 8 barrels a day; the other one makes 20 a day. We believe it's unfair upon seismic information alone and what he's postulated here, to enter upon a course of action that precludes this field to be developed on 320 acres.

We have seen this kind of case recently and it's all based upon Mr. Greer's work and ultimate success, the great success he's had in the West Puerto

Chiquito Mancos.

We've allowed Mr. McHugh to space a Mancos oil pool on 320 acres for a temporary period, and I think everyone here admits that this reservoir is very much like those and I don't see that we'd do anyone harm, particularly Champlin, to allow the spacing pattern to be developed on 320 acres for this one year period, and we would so request that our application be granted.

MR. RAMEY: Thank you, Mr. Kellahin.

Does anyone have anything further in Cases 8030 and 8063?

I would request Mr. Carr and Mr. Kellahin provide me with proposed orders for these cases.

MR. KELLAHIN: Be happy to.

MR. RAMEY: With that we will take the cases under advisement and the hearing is adjourned.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR