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

19 November 1986

COMMISSION HEARING

IN THE MATTER OF:

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| The hearing called by the Oil Conservation Division on its own motion to amend the special pool rules for the West Lindrith Gallup-Dakota Oil Pool in Rio Arriba and Sandoval Counties, New Mexico; and | CASE 9226 |
| To amend the special pool rules for the Gavilan-Mancos Oil Pool in Rio Arriba County, New Mexico. | CASE 9227 |

BEFORE: William J. Lemay, Chairman
Erling A. Brostuen, Commissioner
William R. Humphries, Commissioner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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# I N D E X

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# E X H I B I T S

MR. LEMAY: Case Number 9226.

MR. TAYLOR: In the matter called by the Oil Conservation Division on its own motion to amend the special pool rules for the West Lindrith Gallup-Dakota Oil Pool in Rio Arriba and Sandoval Counties, New Mexico.

I believe, Mr. Commissioner, we -- that this case was heard in part at the last -- at the last hearing and that the Commission did put on its testimony.

MR. LEMAY: That's correct. 9228 was heard first and I think we combined that, though, Jeff, with 9226 and 9227.

MR. TAYLOR: Yeah, I think that --

MR. LEMAY: So if you'd like to read that Case 9227, we'll --

MR. TAYLOR: Okay.

MR. LEMAY: -- continue the consolidation to hear additional testimony.

MR. TAYLOR: Case 9227 is in the matter called by the Oil Conservation Division on its own motion to amend the special pool rules for the Gavilan-Mancos Oil Pool in Rio Arriba County, New Mexico.

I would just state, Mr. Chairman, that I don't -- unless there is testimony by other parties in this case, I don't think the Division has any other testimony to add, unless it would be in response to testimony from other parties.

MR. LEMAY: Okay, thank you. I will now call for appearances in this case, or these combination cases.

Mr. Kellahin?

MR. KELLAHIN: Mr. Chairman, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of Sun Exploration and Production Company, and Dugan Production Corporation.

MR. LEMAY: Thank you. Additional appearances?

Mr. Stovall?

MR. STOVALL: Mr. Chairman, I am Robert J. Stovall of Farmington, New Mexico, appearing on behalf of Curtis Little Oil & Gas, Minel, Inc., Herbert Kai, T. H. McIlvain Oil & Gas Properties, Ed Hartman, and New Mexico Arizona -- New Mexico and Arizona Land Company.

MR. LEMAY: Thank you. Are your clients all in agreement on this case?

MR. STOVALL: So far.

MR. LEMAY: Mr. Lopez?

MR. LOPEZ: Mr. Chairman, my name is Owen Lopez with the Hinkle Law Firm in Santa Fe, New Mexico.

I entered my appearance in the original case and I assume this is a continuance of those cases, on behalf of Mesa Grande Limited and Mesa Grande Resources, Inc.

MR. LEMAY: Thank you. Mr. Pearce?

MR. PEARCE: May it please the Commission, I am W. Perry Pearce of the Santa Fe law firm of Montgomery and Andrews, appearing in these consolidated cases on behalf of Amoco Production Company, and I am appearing in association with Mr. Kent Lund of Amoco's Denver office.

MR. LEMAY: Thank you, Mr. Pearce.

Welcome to New Mexico, Mr. Lund.

MR. LUND: Thank you, Mr. Chairman.

MR. LEMAY: As I recall, we left off with the presentation of cases by Mr. -- of exhibits and testimony by Mr. Lopez. I think we might continue with Mr. Lopez if he has additional testimony at

this time or we can go on to --

MR. LOPEZ: Well, I think that we established at the last hearing, Mr. Chairman, any testimony we would have would be in rebuttal to any other testimony.

MR. LEMAY: Fine. Thank you, Mr. Lopez. I wanted to give you the opportunity to continue if you had additional witnesses.

Mr. Pearce.

MR. PEARCE: Mr. Chairman, if I may for clarification, at the -- my recollection is that at the end of the last hearing on this matter Case 9228 was taken under advisement and I am wondering if we have an order on that case yet since it needs to be decided with the two under consideration now.

MR. LEMAY: We have one that's just signed now and I'll be happy to distribute that. Would this be the proper time to take a break to distribute thqt order to all of you, since it probably might affect these proceedings?

MR. PEARCE: I would appreciate it. I don't know about the others.

MR. LEMAY: Sure. Let's do that. We'll take a fifteen minute break now and distribute this signed order.

(Thereupon a recess was taken.)

MR. LEMAY: The hearing will be continued.

At this time we've called the consolidated cases. Mr. Lopez, I think, has indicated that he is through with his direct testimony but reserves the right of rebuttal and cross examination, of course.

Now we will hear, I think, maybe Mr. Kellahin. Are you ready to presebt your case, sir?

MR. KELLAHIN: Yes, Mr. Chairman. We're ready to go forward.

MR. LEMAY: Fine. Please continue.

MR. KELLAHIN: Mr. Chairman, I have some witnesses I need to have sworn. I would like to swear all three of my witnesses at this time.

MR. TAYLOR: If anybody else has any witneses they propose to call --

MR. STOVALL: Mr. Chairman, I have a witness I'd also like to be sworn.

MR. TAYLOR: -- could we just have them all stand and be sworn?

(Witnesses sworn.)

MR. LEMAY: You may continue, Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Chairman.

Mr. Chairman, we're going to call as our first witness Mr. Ken Mueller. Mr. Mueller spells his name M-U-E-L-L-E-R. You may be familiar with his father, Bill Mueller from Phillips, who's testified here a number of times.

Mr. Mueller is an engineer for Sun. He is presenting a position for Sun with regards to the buffer gas allowable that was suggested at the October 19th hearing, and pursuant to that proposal, Mr. Mueller has made a study of and proposes to discuss with you in some detail questions about whether if a buffer should be established and if one is, what type of buffer it should be.

I'll tell you very briefly, our position is that Sun and Dugan Production Corporation are opposed to the creation of a buffer gas allowable; however, if the Commission desides that it wants to adopt one, we are opposed to the proposal that Mr. Sweet and Mesa Grande gave you on October 19th and we are going to suggest reasons why we think that proposal is inequitable and Mr. Mueller will

have an alternative suggestion for you.

MR. LEMAY: Fine. Oh, you may continue, Mr. Kellahin. I'm sorry.

KEN MUELLER,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A Kenneth Mueller. I'm District Reservoir Engineering Manager for Sun Exploration and Production in Denver, Colorado.

Q Mr. Mueller, we don't have the advantage of a microphone in the hearing room today, so if you'll speak up for us as best you can, we'll all try to hear what you have to say.

Would you describe for the Commission what has been your educational background?

A I graduated from Texas A & M in 1979 with a Bachelor of Science in petroleum engineering.

Q Subsequent to graduation, Mr. Mueller, have you been employed as a petroleum or reservoir engineer?

A Yes. Starting in May of 1979, I started as a reservoir engineer with Sun in Midland, Texas.

In 1982 I was transferred to Dallas, Texas with Sun. I worked there in their Reservoir Simulation Department.

In May of 1986 I was transferred to our Rocky Mountain District as District Reservoir Engineering Manager with Sun.

Q Mr. Mueller, are you familiar with the area that has been defined as a boundary by the Division or the Commission between the West Lindrith Pool and the Gavilan-Mancos Pool?

A Yes.

Q And are you familiar with the proposition that a buffer gas allowable has been suggested for handling the disparity in the allowables between the two pools?

A Yes, I am.

Q What were you asked by Sun Exploration and Production Company to do with regards to that issue?

A I was asked to make a study of the area and to see if there is a need for allowables.

Q What information have you studied in a general way, Mr. Mueller?

A I've studied the production for the Gavilan Field and the West Lindrith Field. I've studied it as

total production and on an average per well per month basis.

I've studied individual well production within the buffer zone and wells near or around the buffer zone area.

Q Would you describe generally what functions you have performed for Sun Exploration and Production Company as a reservoir petroleum engineer?

Generally what type of duties have you performed?

A Most of it's reserve evaluations. Some of it's reserve audits and things like that.

The economic evaluations of drilling proposals, and economic evaluations of just other business.

MR. KELLAHIN: At this time, Mr. Chairman, we tender Mr. Mueller as an expert reservoir engineer.

MR. LEMAY: Mr. Mueller's qualifications are acceptable.

Q Have you reached an opinion, Mr. Mueller, as with regards to whether or not in your opinion there is a need for a buffer gas allowable between the two pools?

A I see no need for a buffer zone.

Q What has caused you to reach that opinion?

A From the producing characteristics of

both fields and wells within the proposed buffer zone, the -- I guess you'd say the proposal for an allowable based on top allowables would basically be ineffective in a buffer zone.

Q In examining the production data available for the Gavilan-Mancos and the West Lindrith wells, do you see a current need for any buffer allowable regardless on how that allowable is calculated?

A No.

Q In your opinion have you had sufficient data upon which to base your opinions?

A Yes.

Q Generally what is the source of the information available that you've studied?

A The general source for most of the production data that I've studied has been Dwight's Energy Data Base.

Q Is that a typical data base source that engineers such as you utilize in your research and in your studies?

A Yes. The production from -- for Dwight's is taken from the reported state production.

Q Does the difference in the top gas allowable for the West Lindrith and the top gas allowable for the Gavilan-Mancos in your opinion create a problem of correla-

tive rights?

A There is a major difference in the top gas allowables between the two pools but I feel there is not a problem with correlative rights.

Q Have you had an opportunity to examine the proposal that Mr. Sweet presented on behalf of Mesa Grande, Inc., with regards to a top gas allowable allocation across the buffer zone?

A Yes, I have studied that proposal.

Q And what is your opinion of that proposal?

A It is basically ineffectual.

Q In your opinion is that proposal by Mr. Sweet equitable or inequitable?

A It's inequitable.

Q If the Commission should determine that they want a buffer gas allowable between the two pools, do you have a recommendation to the Commission for such an allowable?

A Yes. I have developed a proposal.

Q Let me turn your attention now, Mr. Mueller, to the package of Sun exhibits. The exhibit book, for the record, is marked as Exhibit One. Each of the individual pages in the exhibit book are numbered in consecutive order.

If you'll turn to the first page, Mr. Mueller, and identify and explain the purpose of that exhibit.

A Okay, the first page is a map of where the buffer zone area lies. It would be extending along the east half of the sections in Range 3 West, and then it would comprise approximately 505 acres of the west, westernmost half of the sections in Range 2 West.

Q Is this an index map by which we can refer back to well locations as those wells are discussed and described in later exhibits?

A Yes.

Q All right, you've divided your exhibit book into three sections and the next page introduces Section 1. Before we get into Section 1 in detail, would you describe generally what the purpose of this section is?

A The purpose of this section is to show that a buffer zone is not needed.

Q Let's turn, then, to the -- turn to page 2, which is the first display after the yellow page and have you begin describing your exhibit book.

A Okay. Page two is just a summary of the current allowable situation for West Lindrith and the Gavilan-Mancos.

West Lindrith is on 160-acre spacing and

the Gavilan-Mancos is on 640's.

The allowables for West Lindrith are 382 barrels of oil, limiting to a 2000 GOR, which yields 764 MCF a day.

The allowables for the Gavilan-Mancos are 800 barrels of oil a day, limiting GOR of 600, which yields a 480 MCF a day limiting allowable.

What I've done is in order to compare the two allowables is based them on 640-acre parcels or tracts so that you can be comparing apples to apples, and you can see the West Lindrith for 640, that allowable is 1528 and 3,056 per day. The Gavilan is 800 and 480.

Q All right, sir, let's turn to page three of the exhibit book and have you identify and describe this exhibit.

A Okay. This is the average monthly production for the Gavilan Field for the years '82 through June of '87.

At the top I've drawn a line that is marked Gavilan Allowable. This is the top maximum allowable. It is 936,000 barrels of oil per month. I calculated that by taking 39 productive sections times the 800 barrels of oil per day maximum allowable times 30 days per month.

There is a darker line towards the middle of the graph. It's marked Gavilan Allowable, 562-million

cubic feet per month. How I calculated that was 480 MCF per day times the 39 productive sections times the 30 days per month.

Also on this graph is the oil production, average monthly oil production in thousands of barrels per month, and the average monthly gas production in million cubic feet per month.

This graph clearly shows that the oil rates are well below the top maximum oil allowables; gas rates are well below the top maximum gas allowable.

Q All right, sir, let's turn to page 4 and have you identify and explain this exhibit.

A This exhibit is the average production per well per month. It is based on the previous exhibit and the number of wells, the average number of wells in each year, and what I've done here is I've taken the 800 barrels of oil per day and drawn a top maximum allowable line of 24,000 barrels of oil per month based on a 30-day month.

I've also done the same for the gas, which is just above -- just over 14-million cubic feet per month.

Once again we can see that an average well in the Gavilan Field is not capable of making its top oil allowable and an average well is not capable of making its top gas allowable.

Q All right, sir, let's turn to page 5 and have you identify and describe this display.

A Okay. Actually the next two graphs are similar graphs as what we've just gone through for Gavilan but these are for the Lindrith Field.

Q Pages 5 and 6 are for the Lindrith Field?

A Yes.

Q All right, sir, start with 5. .

A Okay. This is the average monthly production for the Lindrith Field, oil and gas. At the top of the page I've marked what would be the top maximum allowable of oil and the top maximum allowable for gas. That's calculated based on approximately 400 wells times the 382 barrels of oil per day times thirty days per month yields just under 4.6-million barrels per month.

The gas allowable was calculated as approximately 400 wells times 764 MCF per day per well times thirty days per month and that yields just over 9-million cubic feet per month.

The actual gas and oil production is plotted there around about 100,000 barrels per month on the oil and about one BCF per month for the gas. Both these lines are well below the top maximum allowable for this field.

Q What's the conclusion you reach from an

examination of the data on this exhibit?

A The conclusion is that the Lindrith Field, West Lindrith Field, is not capable of making its top allowable.

Q Before you leave this display, at the last hearing in October Commissioner Humphries was concerned about the commingled Gallup and Dakota production in West Lindrith.

A Yes.

Q Does your tabulation of average production per month include commingled Gallup/Dakota production in the Lindrith Field?

A Yes. This is what is reported into Dwight's and that would include Dakota and Gallup production. In fact, if you look at the years '77 through '79, this is about the time that the Chacon Dakota Field was I guess you'd call it disbanded, and moved into the West Lindrith Field and that increased some well count and oil and gas rates during that time period.

Q Do you know what the principal producing formation was in the Chacon Field?

A It was Dakota.

Q All right, sir, let's go to page 6 and have you identify and describe this exhibit.

A Page 6 is average production per well per

month for the Lindrith Field. I've plotted the average monthly gas per well and the average monthly oil per well. I've also drawn on here what would be the maximum top allowable for a well in the West Lindrith and that's just over 11,000 barrels of oil per month, and almost 23-million cubic feet of gas per month, and once again you can see from this graph that an average well in the West Lindrith Field is not capable of making its top allowable.

The -- basically, these four graphs serve to prove that top allowables are not a good way of determining how to set a buffer zone.

The fields and the wells are incapable of making a top allowable.

Q Let's turn to page 7 now, Mr. Mueller, and have you identify and describe this exhibit.

A Okay. This is a comparison of the West Lindrith Field to the Gavilan Field average production, monthly production.

We have plotted on here the West Lindrith gas production and the West Lindrith oil production and the Gavilan oil production and the Gavilan gas production.

Total fieldwise we can see that the West Lindrith gas production is almost six times what the Gavilan gas production is but the West Lindrith production is real close to what the Gavilan oil production is; in fact in 1986

Gavilan oil production did exceed West Lindrith oil production.

The conclusion that could be inferred from this graph is that with very little difference in the oil production here in the last two years, that little or no drainage is occurring.

The next graph --

Q That would be page 8, are we still on the same page?

A Yes, page 8.

Q All right, sir, would you identify and describe this display?

A This is the average production per well per month for both the Lindrith and the Gavilan Field. It's a comparison basically that can made as an average well in both fields.

We can see that the Gavilan oil production per well is well above the West Lindrith oil production per well. The productivity of a Gavilan well is about five times about what a West Lindrith well is.

The Gavilan gas curve and the West Lindrith gas curve, although the Gavilan gas curve is a little bit above it, there's very little difference gas ratewise in an average well (unclear) is necessary and definitely that a top allowable calculation is not an effective way of buffer-

ing between these two pools.

Q Turn to exhibit page 9, Mr. Mueller, and would you identify and describe this exhibit?

A This is the West Lindrith well capacity distribution. We've broken these into four ranges from zero barrels of oil a day up to 160 barrels of oil per day and then 160+.

What it shows here is that most of your West Lindrith wells are not capable of making a high oil rate and that in fact over 50 percent of them are in the zero to 20 barrel a day range.

We've done the same on the gas. It goes from zero to 800 MCF a day and then an 800+ MCF a day range and that only 4 percent of the wells in West Lindrith are capable of making over a top allowable rate and that once again most of your wells in West Lindrith are in the zero to 100 MCF a day range.

Q What conclusion do you draw from this analysis?

A That there is -- most of the wells in West Lindrith are low productivity wells and that there are very few wells, it would be less than one percent, that are capable of making a top oil allowable and less than, or approximately four percent, that are capable of making a top gas allowable.

Q In your overall analysis of this issue what impact does that have?

A That means that we're dealing with very, very few wells, or a very small percentage, that we're trying to deal with in setting top allowables in a buffer zone.

Q Turn to page 10, now, Mr. Mueller, would you identify and describe this exhibit?

A This exhibit shows that I do not know how to spell percent.

Q You can always blame that on clerical.

A Once again this is actually just a graphical picture of the data presented on the previous exhibit. It has the percentage of wells on the vertical scale in each of the ranges for the oil rate. What I've done is just plotted the data at the midpoint of the range.

It shows that very few, and basically it's less than one percent, are capable of doing better than 160 barrels of oil a day and that well over 50 percent are in the zero to 20 barrel of oil a day range.

Q Let's turn now to the similar display on the gas rate on page 11 and have you identify that for us.

A This is your capacity distribution of the gas rates from the previous tabulated data.

Once again I've plotted the percentage of

wells on the vertical axis and the horizontal axis is the ranges in gas rates that we have broken them up to.

West Lindrith has a 764 MCF a day top allowable on the gas, which this would show that four percent, only four percent of the wells would be capable of making that, with well over fifty percent of the wells in the zero to 100 MCF a day range. It shows that West Lindrith has low capacity wells.

Q Have you made a similar analysis of the Gavilan well capacities?

A Yes.

Q Let's turn to page 12 and have you identify and describe that, the information you have obtained on the Gavilan well capacity.

A Okay. I've taken the Gavilan wells and broken them in ranges, the same ranges as in West -- West Lindrith, from zero to 160 there are four ranges and then 160+, for the oil.

There would be four ranges from zero to 800 MCF a day for the gas and then 800 MCF a day plus for gas.

We show the percent of the total wells in a cumulative percent and we can see here that in Gavilan it would be, which has a top allowable of 800 barrels of oil a day, it would be well below less than 11 percent that are

capable of making that top allowable.

On the gas the top allowable is 480 MCF a day and over there in the cumulative percent column you can see that there would be approximately 36 percent of the wells would actually be able to make a top allowable rate.

Q What is the source of the data for the Gavilan well capacities?

A This was Dwight's data. It's 1987 data and what we've done is picked out the highest producing reported production for each well in 1987, so this is basically their current well capacity.

Q These represent all the wells in the Gavilan-Mancos Pool?

A Yes.

Q When we look back at the Lindrith well capacity, what was the source of information for the Lindrith capacity, as shown on exhibits ten and eleven?

A That once again was from Dwight's data for what their current capacity is, which 1987 data was used.

Q In that well count did you include the historical production capacities of each of the wells from inception of the pool? I'm trying to understand exactly where you started with your study.

A No, these -- these six plots are 1987 da-

ta only.

Q All right, let's turn now to -- 12, let's go to 13, now, and see how you've plotted the information that you've depicted on page 12.

A Okay. On 13 we have once again the vertical axis is percentage of the wells and then the oil rate is midpoint of range, and we can see that Gavilan has a more uniform or constant distribution of wells, indicating that Gavilan has more higher capacity wells than what West Lindrith had.

Also, it shows that there would be less than 11 percent of the wells that are capable of making a top allowable oil rates.

Q All right, let's turn to the display on page 14 that shows the gas capacity of the Gavilan wells.

A Okay. Once again here you can see that the distribution of the wells is much more constant than what we had seen in West Lindrith. The maximum top allowable for Gavilan is 480, which shows here that 36 percent of the wells are capable of making that maximum gas allowable. The more constant distribution shows that in general all the wells in West Gavilan are higher capacity than the West Lindrith.

Q What use has this information been to you in analyzing whether or not there ought to be a buffer al-

lowable between the two reservoirs or the two pools?

A Well, I've used these statistics to come up with how many wells we'd actually be affecting by setting a top allowable based on what each allowable is in -- in each pool, and even if you use it -- there's only eleven wells additional to be drilled in the buffer zone and you could take this -- I mean the highest we've seen at any -- any well is going to be limited, the highest percentage number of wells is the 36 percent based on Gavilan's, well, gas capacity, and with eleven wells and at 36 percent of that, we're only -- in the buffer zone we're only talking that we'll ever see three to four wells affected by setting a buffer zone based on top allowables.

Q Turn to page 15 now, Mr. Mueller. Would you identify and describe that exhibit?

A Okay. 15 was basically like the capacity distributions for the West Lindrith previously shown, except I went all the way back to 1970 to get a maximum capacity for West Lindrith wells.

Q Would you describe for us what you mean by "maximum capacity"?

A Maximum capacity is what the wells have been -- have demonstrated they can do, and what that is is each well was searched for its maximum gas production in a month and its maximum oil production month.

Q You're talking about actual production as opposed to looking at initial potentials for the wells?

A Right, what it -- the maximum month it had ever reported production for.

Q And since 1970, making the tabulation in that manner, what do you find?

A Okay. I've divided them up once again in the same ranges as -- as before; four ranges in the zero to 160 barrels of oil a day and 160+. We can see that doing it this way West Lindrith then has a more uniform distribution, more like Gavilan does -- is showing now.

However, it also shows that it is still less than 6 percent that have a capacity high enough to even reach near top allowable for the oil.

I've done the same on the gas, divided it in four ranges from zero to 800 and then an 800 MCF a day plus, and on the percent of total here we can see that their top allowable, being 764 MCF a day, that is still less than 10 percent of the West Lindrith wells that are -- would be capable of making a top allowable rate.

So once again I'm just emphasizing the fact that we're dealing with very few wells in setting a buffer zone allowable based on top allowable rates.

Q Let's turn now, sir, to Section II, and before we go through the individual pages of Section II,

would you generally describe for us what the purpose is of this section?

A The basic purpose is that if a buffer zone is to be created, that Sun has come up with a more equitable way of determining what top allowable will be in the buffer zone.

Q In reviewing the issue of a buffer zone, would you describe for us what your concerns are having studied Mr. Sweet's proposal, what your concerns are about his proposal?

A His proposal basically has a high percentage increase in the Gavilan side of the buffer zone. It's shown very clearly here on the next exhibit, that taking his proposal that was presented last month, and rather than basing it on a per acre, I personally like to look at it on 640-acre tracts or parcels rather than per acre. The rates mean more to me this way.

Q All right, let's look at page 16. This is your analysis of what occurs if the Commission were to adopt the top gas allowable buffer allocation that Mr. Sweet proposed?

Am I correct in understanding that's what this does?

A Yes, this shows, like I say, rather than on a per acre basis, on a 640.

Q You refer to that as an equal increment proposal?

A Yes.

Q What do you mean by that?

A That's because he took the difference between the West Lindrith top allowable and the Gavilan allowable, took that difference and divided by 3, which gives you equal increments, and he incremented each part of the buffer zone by that increment, stepping it up from the Gavilan area to the West Lindrith area.

Q If you do that can you show us on your exhibit on page 16 what the perentage change is for each of htose areas as you step across the buffer?

A Yes. On the oil we see that he has a two -- almost a 243 barrel a day increment and that percentage change on the Gavilan side is a 30.3 percent change, which gradually decreases to about a 19.9 percent change over in West Lindrith.

The gas increment that he had proposed was just under 859 MCF a day. Now this causes almost 179 percent change in allowables within the Gavilan area and that percentage change decreases from 179 down to 39 in the West Lindrith.

This is inequitable since Gavilan, with the lower gas rates, should have such a high increment and a

high percentage change. Sun feels that most of that increment, most of that change should occur on the West Lindrith side where the higher allowables are existing.

Q Have you reduced this analysis to the actual rates --

A Yes.

Q -- that would apply?

A Yes. At the bottom of the page, based on spacing rather than on a per acre or a 640-acre tract, these would be the rates or top allowables, I should say, for each well.

On the Gavilan side we see it's 800 and 480. On the West Lindrith side each well would have a top allowable of the 382 and the 764.

In the buffer zone what we see is on the Gavilan side a well would actually have a top allowable greater than the Gavilan area for oil and definitely on the gas.

On the West Lindrith side we can see that once again it dips down to 321 and 549 and then back up again in the West Lindrith Pool.

Q So if we examine the allowables set on the Gavilan side, within the Gavilan Pool itself when you compare a Gavilan well to a Gavilan buffer well, there is going to be a difference in the allowables.

A Yes. A Gavilan buffer well will actually be producing about 2.8 times for a corresponding Gavilan well would based on gas allowables.

Q All right, sir, let's turn now to page 17. Does this represent Sun's proposed buffer allowable if the Commission adopts one?

A Yes. This is Sun's proposal. We call it an equal percentage change proposal in contrast to the equal increment change.

Looking at the percentage changes on here, Sun proposes just having a straight 24.1 percent change in the oil rates coming across from Gavilan to West Lindrith. This results in increments that increase from 192 barrels of oil a day up to the highest increment of 296 barrels of oil a day and that largest increment being within West Lindrith.

On the gas we propose an 85.3 percent percentage change; the actual increments, then, change from 409 MCF a day up to 1407, once again showing that the highest incremental change occurs in the West Lindrith side where they have the higher gas allowables.

Q When you translate this to the actual producing rates in the pools, have you given us the numbers?

A Yes. Based on spacing and actual per well top allowable, then, in the Gavilan area would be the

800 and the 480 and over in West Lindrith we show it's 382 and 764, and in the Gavilan buffer under Sun's, we now have a 783 barrel of oil a day and a 702 MCF a day top allowable.

On the West Lindrith side of the buffer it would be a 308 barrel of oil a day top allowable and a 412 MCF a day top allowable.

You can see that here we're finally actually taking an average well and the allowable in Gavilan for the oil decreases, as it should, going from a high oil per day to a lower oil per day, and then the gas, although it shows going from 480 to 702, then to 412, 764, at least we've cut down this large percentage increase that is being suffered on the Gavilan side, where we already have some problems with allowables.

Q Have you utilized the same location of the buffer as was proposed by Mesa Grande in October? In other words, the location of the buffer is at the same point in the corresponding sections?

A Yes, it is. That's why the Gavilan buffer area is labeled as a 505-acre is that's about the average the area is and that is also why the West Lindrith buffer area is labeled as 160-acre, because that would be 160-acre spacing in the West Lindrith area.

Q Have you made a compariso now of the equal increment proposal and Sun's equal percentage proposal

on page 18?

A Yes.

Q All right, show us what you've done here.

A Okay, this graphically shows the difference in the concepts of the two proposals. The first proposal is basically the equal increments proposal and it's 800 -- it's a constant change of 859 MCF a day coming from Gavilan, which would have zero change, to the Gavilan buffer, West Lindrith buffer, and then into West Lindrith.

It is basically to the dashed line across the middle at 859 MCF a day.

Sun's proposal, being the equal percentage proposal, we show that our increments increase as you go from Gavilan into the Gavilan buffer, then West Lindrith buffer, and into West Lindrith.

This is to emphasis the fact that our proposal is putting the larger incremental change on the side with the higher gas allowables.

Q Let's turn to page 19 now, Mr. Mueller. Would you identify and describe that exhibit?

A Okay. This exhibit is the percentage change and this is -- once again is to serve as a demonstration of what we're proposing. Sun's proposal is shown as the dashed line here because we are promoting a constanct 85.3 percent change across.

If you look at the first proposal presented last month, which are equal increments, as shown on the previous graphs, their actual percentage changes range from 179 percentage change going from Gavilan into the Gavilan buffer area. The percentage change then drops to 64 percent going from the Gavilan buffer into the West Lindrith buffer, and their percentage change drops again once you get to going from West Lindrith buffer area into West Lindrith.

It's this large 879 percent change that is in the Gavilan Pool that concerns Sun.

Q All right, sir, let's turn to page 20 and have you identify and describe that display.

A This display is showing, based on what is proposed under each proposal; we have equal increment proposal graphs and equal percentage graphs, and these are the rates that -- the actual gas allowable rates based on a 640-acre tract that would be in effect for -- under our proposal and the previous proposal.

It shows that the increments under Sun's proposal grow as you go from Gavilan to West Lindrith, and under the first proposal the increments once again are equal.

This is a good comparison here in the Gavilan and Gavilan buffer that we're trying to keep these a little more consistent here and then have the higher incre-

ment change over in West Lindrith where you have the higher gas allowables.

Q All right, sir, let's turn to page 21 and have you identify and describe this display.

A Okay. These displays are for the oil allowables of Sun's equal percentage change proposal and the previously presented equal increments proposal and we can see that the equal increments, they had 243 barrel a day increments coming from Gavilan into West Lindrith.

Sun's proposal would be an increase from 192 barrel a day increment up to 296. But it basically shows that oil allowablewise the two are real close. There's not much difference incrementally.

At the bottom we're showing a percentage change under the two proposals for the oil allowables and the equal increments change once again shows a decrease in percentage. In the Gavilan buffer it would be 30.3 percent change and going from the West Lindrith buffer over into West Lindrith Pool the change would only be 18.9.

Our proposal would just keep it at a constant 24.1 percent change.

But once again, this graph is showing that both proposals are real close on oil allowables.

Q And let's turn now to page 22, Mr. Mueller, and have you identify and describe that exhibit.

A Okay. This is a graph once again based on 640-acre parcels or tracts of the two proposals, the equal increment change proposal and the equal percentage proposal, and we can see that both increase going from Gavilan to West Lindrith; Gavilan you're at 800 and over in West Lindrith you'd be at 1528 per 640, but the exhibit really serves to show that both buffer zone allowable proposals cause very little change in the oil allowables.

Q Let's turn now to Section III, Mr. Mueller. Have you made a study to determine the actual impact on existing wells at producing rates that might apply in the buffer areas of the two pools?

A Yes.

Q Would you describe generally for the Commission what the purpose is of Section III?

A The purpose of Section III, I guess is two purposes. Once again the first purpose is to show that no buffer is needed. The second purpose is to show that using top allowables, a buffer zone would basically be ineffective.

Q I don't propose to go through each of the displays in this section, but would you commence with one of those of your choice and let's discuss how you have tabulated and presented the information in this section?

A Okay. In general, these are wells either

in the buffer zone area or adjacent to the buffer zone area. With so little development on the West Lindrith side of the buffer we had to use four wells that were actually adjacent to it that have any sort of production history to them, and one well actually would lie within the buffer area. That would be the first five graphs.

On the Gavilan side we also show some production history on the next five graphs of Gavilan wells that are in the buffer area or near the buffer area.

Q All right, let's take the third display in this section, which is page 25. It's the Fred Davis Well No. 1.

A Yes.

Q This well is not in the West Lindrith buffer zone but you've utilized it because it's representative of the West Lindrith wells?

A Yes. We've, like I say, once again, West Lindrith, you know, is undeveloped in the buffer zone basically but if you assume that this well is directly offset into the West Lindrith side of the buffer zone, the basic assumption, using this comparison, would be that an average West Lindrith well that would come in like this and behave like this would not be effected by either the proposed oil allowable that you see drawn on the graph or Sun's proposed gas allowable that you see drawn on the graph there.

Q On each of these displays in this section when you say "proposed oil allowable" or "proposed gas allowable", it is Sun's proposal that you've identified?

A Yes. I've identified Sun's proposal because it's actually a lower allowable than what was proposed previously, such that if Sun's proposed allowable would not affect these wells, then certainly the previously proposed formula would not affect these wells.

Q When we go to the first page in this section, which would be page 23 --

A Yes.

Q -- and look at the NZ Well No. 2 --

A Yes, this is the only well that -- of the five that I studied on the West Lindrith side, that could possibly see some sort of curtailment under Sun's proposed gas allowable.

Our proposed oil allowable is shown up there just under the 10,000 barrels per month, and Sun's proposed gas allowable for the West Lindrith side of the buffer is shown there at near 15-million cubic feet a month, and you can see that the NZ-2 gas production is in that range and may experience some curtailment.

Q Let's turn now to the last five pages and turn to page 29, which is the display on the Mesa Grande Brown Well.

Of the wells that you examined in the Gavilan-Mancos side of the boundary, is this the only well that you saw that would be curtailed?

A Yes. This is the only well under Sun's proposal on the Gavilan side of the buffer that would be affected by Sun's proposed oil and gas allowables. Once again, I've drawn the proposed oil allowable by Sun, which is just over 20,000 barrels per month, and Sun's proposed gas allowable, which is just over 20-million cubic feet of gas per month, and we can see that the last couple of months there for the Brown Well have been above Sun's proposed allowable.

Sun's proposed allowable, as I've mentioned previously, is lower than the previous proposal; that under the previous proposal, that is the equal increment propasal, this well would not be affected. Its gas allowable would be over 30-million cubic feet a month and you can see this -- this well will be unaffected by that proposal.

Q Let me turn that around. Under Mesa Grande's proposed buffer gas top allowable, is this the only well in the buffer that would benefit by the increase in allowable?

A Yes.

Q Let's look at exhibit number -- page

number 30 on the Loddy Well and have you describe what occurs with regards to the Sun proposed allowable if place on that well.

A On the Loddy Well?

Q Yes, sir.

A Sun's proposed gas allowable, proposed oil allowable are, once again, the darkened lines there, and the Loddy Well gas or oil does not reach either of those maximum allowable lines, and therefor this well would experience no curtailment due to top allowable.

Q Having gone through this analysis in Section III, what is your ultimate conclusion with regards to the equities of Sun's proposed buffer gas allowable?

A Well, we feel that Sun's allowable is at least more equitable than the previously proposed allowable and that it at least affects some wells and the previous proposal would affect none of these wells that are here and if we're going to set up a buffer to protect correlative rights, it seems like we ought to be affecting something.

Q Does Sun concur in the utilization of this short section on the township line as being the pool boundary for administrative purposes between Gavilan-Mancos and the West Lindrith Pool?

A Will you repeat that?

Q Yes, sir. We're looking at the boundary

line that the Commission has established in this recent order as being the boundary between the pools. Does that serve as a convenient place to have a boundary for administrative purposes?

A Yes.

Q From an engineering point of view that does not represent the actual boundaries of the reservoir, does it?

A No, sir.

Q You may have wells on either side of that line that may act like wells on the other side of the pool?

A Yes.

Q At this point, though, if that line is used as a basis upon which to set a buffer gas allowable, do you believe that represents a convenient place to set such a line and boundary?

A Yes, that would be the most convenient place to set it.

Q Have you provided in your exhibit book a summary of your opinions?

A Yes. The last two pages are the summary of what each section -- the purpose of each section, what I feel each section clearly shows.

Q Would you summarize now for us, Mr. Mueller, what is your ultimate conclusion about the

development and risks involved in trying to establish a buffer allowable at all for the two pools?

A In summary, like I said, the whole first section proves to me that buffering is not really necessary; that based on the statistical anaylsis that I've done, only three to four wells on the twenty total that would end up in the buffer zone, assuming complete development, would ever be affected by setting these top allowables.

As was shown in Section II, if we're going to have to set a buffer in there, that Sun's proposal is more equitable and would at least show some effect from buffer.

MR. KELLAHIN: This concludes my direct examination of Mr. Mueller, Mr. Chairman. We would move the introduction of Exhibit Number One.

MR. LEMAY: Without objection Exhibit One will be admitted into evidence.

Cross examination Mr. Mueller? Mr. Pearce?

MR. PEARCE: Thank you, Mr. Chairman.

CROSS EXAMINATION

BY MR. PEARCE:

Q Mr. Mueller, I'm Perry Pearce and I'm ap-

pearing in this matter on behalf of Amoco Production Company and I've just got one or two real brief -- in your exhibit I don't notice any differentiation in production in the West Lindrith between Mancos and Dakota. Was there any?

A No.

Q Okay, do you have any information of what percentage of oil or gas production in the West Lindrith can be attributed to the Dakota zone as opposed to the Mancos?

A From previous hearings, and all, and just what I have been told, I haven't personally studied a percentage number to arrive at it, but I've been told it's in the range of 50 to 70 percent.

Q Of both oil and gas?

A That I would not venture to guess. Like I say, I have not personally made a study. Previous testimony in front of this Commission and from talking with others who have worked in the area, I wouldn't know if they're basing that on oil or gas.

Q Okay. Thank you.

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

MR. LEMAY: Thank you, Mr. Pearce.

Any questions?

MR. LOPEZ: Okay, Mr. Chairman,

I'll do my best. I feel somewhat at a disadvantage since Sun has had our proposal for a month or so and I thought I understood at our last hearing that Sun would make its exhibits and the thrust of its testimony available to us well in advance of this hearing.

MR. LEMAY: Would a short recess help you at all to gather some (inaudible)?

MR. LOPEZ: Yes, I think a five or ten minute recess would be fine.

MR. LEMAY: Why don't we take a ten minute recess and convene back then.

(Therupon a recess was taken.)

MR. LEMAY: We shall resume the hearing with Mr. Lopez on cross examination of Mr. Mueller.

MR. LOPEZ: I think I can be mercifully brief, Mr. Chairman, since ten minutes probably wouldn't have done me any better than all day.

CROSS EXAMINATION

BY MR. LOPEZ:

Q Mr. Mueller, I think at the -- towards the end of your testimony you stated that the existing boundary line between the westernmost boundary of the Gavi-

lan-Mancos and the easternmost of the West Lindrith was in your opinion principally a boundary of administrative convenience, is that correct?

A Yes.

Q And in your opinion I think you stated that it did not represent the geologic boundary between the two pools.

A (Inaudible to the reporter.)

Q Well, I do think that in your opinion it did not represent the geologic boundary between the pools. I believe you testified to that.

A Yes.

Q Now, it's true, isn't it, that the wells that are located and drilled in the West Lindrith Pool are subject to the standard statewide gas/oil ratios and allowables?

A Yes, they're subject to the 2000 GOR.

Q And isn't it true, and what much of this controversy has been about, that the wells over in the Gavilan-Mancos are now subject to special pool rules which have reduced the gas/oil ratios and allowables as a result?

A Yes.

Q And it's true that Sun supported that -- the special pool rules that so affected the producing rates of Gavilan, isn't that so?

A Yes.

Q Okay. So now we have a difference of the allowable structures between the two pools. Isn't it true that under the current spacing rules for West Lindrith that one well can be drilled on 160 acres and therefor you could have four producing wells within a section?

A Yes.

Q And that in Gavilan the rules are now on a 640-acre spacing and subject to probably controversy in cases that may be addressed after this case today, that only one well under the new rules could be drilled on the standard 640-acre spacing?

A Yes. You can have an option to drill a second well.

Q With an option to drill a second well. So -- and isn't it also true that with respect to the setback from section lines the wells in Gavilan-Mancos must be set back farther from the boundary line than wells that could be drilled in the West Lindrith under present rules?

A I believe that's correct, yeah.

Q So, am I to understand your testimony and that it's your opinion that there's no problem with respect to the correlative rights of operators on both sides of this boundary that has been drawn for administrative convenience purposes and doesn't represent the geologic boundary between

the two pools, yet in West Lindrith you can have four wells per section along the boundary line producing at unrestricted statewide allowables and closer to the boundary line, and in Gavilan you have only two wells with a greater setback that are restricted in their producing rates?

How would you explain that?

A Basically because none of the wells, if you go by the statistics and the averages, are capable of making those top allowables anyway.

Q Well, I think you stated that there are virtually little or very few development wells along the zone, buffer zone in the West Lindrith.

A Yes.

Q And there are some on the Gavilan-Mancos side. Isn't it true that on the Gavilan-Mancos side some of those existing wells not only are restricted in their production rates by virtue of the special pool rules, which you supported, --

A Yes.

Q -- but are located on less than standard spacing units, 185-acre spacing units, for example, and therefor are further reduced in their producing capabilities because they do not measure up to the special pool rules?

A I know of only one well that's actually on at 100 -- that is actually allotted the 185 proration

unit.

Q I think, if I understood you -- your testimony this morning, that you said that your average over in Gavilan-Mancos was the standard 505.

A Yes, that's --

Q Did I get that --

A Yes, because that's the average. There are -- there's two areas that that would be different.

Q But isn't it true that along the buffer zone in Gavilan we have actual instances of where there's 320-acre spacing units?

A Yes.

Q And so along the buffer zone in the Gavilan we only -- we have a spacing unit of 185, one of 320, one of 505, but in fact we don't have any average spacing units and therefor wells in the buffer zone in Gavilan, isn't that so, based on 640.

A Well, I would say that the 505 is the effective Gavilan buffer area because, as you have pointed out, that if you have two wells in that 505, one experiences a cut in any proposed allowable.

Q But it's true that you can offset the Gavilan wells with four wells on a 640 in West Lindrith, in an area where there's been very little development.

A Well, assuming the spacing is 160, yes,

there could be up to four wells on a section.

Q Are you aware that there exists a buffer zone along the eastern boundary of the Gavilan-Mancos between the West Puerto Chiquito and the Gavilan-Mancos Pool?

A Yes.

Q And didn't Sun support that buffer zone and the rules that were adopted in connection with it?

A Yes.

Q And isn't it true that along the eastern buffer zone of the Gavilan-Mancos we have in effect rules that allow, not only with respect to spacing, but distance from the boundary line and with respect to producing rates under allowables that are exactly the same rules in place?

A I don't believe I understand the question.

Q Well, isn't it true that we have come up with a formula whereby the wells in the West Puerto Chiquito are produced in very equitable ratios to the wells that produce in Gavilan despite the fact that -- the fact that they're allowed to produce at exactly the same rates under the same spacing conditions?

A I believe that's the way (not clearly understood) to be designed, yes.

Q And how would you distinguish, then, the need and benefit to be derived from the buffer zone on the

eastern flank of the Gavilan-Mancos Pool when by your own testimony you say that the western boundary doesn't necessarily or maybe in your opinion doesn't -- need not represent the geological boundary, yet you're willing to go ahead and allow four wells in West Lindrith to produce and no restriction, and only two wells in Gavilan under restriction?

A Well, as far as I can see, there's not going to be many wells in West Lindrith that can beat two Gavilan wells, anyway.

Q Isn't it true that Sun owns acreage on both sides of the western boundary line, the imaginary or administrative boundary line (unclear)?

A I believe we may have picked up some to the west of the boundary.

Q One final question. Isn't it true that your formula that Sun proposes for West Lindrith would have a greater adverse effect on the West Lindrith wells than that that has been -- is being proposed by Mesa Grande?

A Yes, our top allowable on the West Lindrith side of the buffer is (not clearly heard.)

MR. LOPEZ: No further questions.

MR. LEMAY: Thank you, Mr. Lopez.

Mr. Stovall?

MR. STOVALL: Yes, I have just a couple of questions, Mr. Chairman.

CROSS EXAMINATION

BY MR. STOVALL:

Q First, I'm in kind of a situation here where I -- maybe I'm doing Mr. Kellahin's redirect, but I'll go ahead and ask you the question anyway. Mr. Lopez raised the issue of the Gavilan - West Puerto Chiquito boundary. Do you have knowledge and familiarity with the engineering and the studies that have gone on in the Gavilan area?

A I have never participated in that Gavilan study committee, technical committee.

Q Have you discussed it with anybody to the extent that you feel comfortable in talking about the reservoir characteristics or (unclear)?

A I feel pretty comfortable with it, yes.

Q Would you say that the Gavilan - West Puerto Chiquito boundary has similar geological producing characteristics to the Gavilan - West Lindrith boundary? I mean are you comparing apples and oranges or are they alike? Do you know?

A Well, in some respects they are probably alike and I feel that in some respects we're probably dealing with a different issue here, also.

Q In what respect would you say they're alike?

A Well, it's what was going on, you were dealing with different allowables, of course, along that boundary, and you set a way of covering that for the effects of a gravity drainage and to protect a gas injection project.

They're alike in that they're both Mancos but on one over there what you're protecting is a true effort from somebody to come up with some additional recovery. It's different on the West Puerto Chiquito side and that -- that basic difference is a basic difference, anyway, than what you're saying here.

This buffer in here is, or supposedly buffer in here, is step rating allowables, which I have shown, very few of these wells are even affected by these top allowables.

Q All right. Now I understand that Sun's position is basically in opposition to a buffer zone, but looking at Sun's proposal for a buffer zone based on a equal percentage rather than an equal increment, as Mr. Lopez has pointed out, Gavilan operates under what we call restricted producing rates, is that not correct?

A Yes.

Q Less than would be statewide allowable

for 640-acre production units.

A That's what I assumed what you meant, yes.

Q Okay. The -- and is it your opinion and belief that the basic reason for this case even being presented and the problem which Mesa Grande in particular is referring to , is because those allowables are restrictive?

A I believe that's what the case is here, yes.

Q Okay, and you've also, I believe I heard you testify earlier, that in making your percentage proposal made no allowance for the fact that West Lindrith Pool includes production from the Dakota formation, is that correct?

A That is correct.

Q And in your proposal has the effect, the purpose of your proposal is to lessen the impact of the buffer zone with respect to the correlative rights of operators with in the Gavilan-Mancos Pool, is that not correct?

A Yes.

Q And what you do when you do that is shift the greater portion of that burden to the operators within the West Lindrith Pool, is that not correct?

A Well, I think I've shown that it's a

little more equitable also on the West Lindrith side.

It's definitely more equitable on the Gavilan side.

Q You say more equitable on the West Lindrith side, you're basing more equitable on the West Lindrith side vis-a-vis Gavilan, not vis-a-vis -- not West Lindrith operators vis-a-vis the other West Lindrith operators of that buffer zone --

A Yes.

Q -- is that not true?

A Yes.

MR. STOVALL: I have no further questions of the witness.

MR. LEMAY: Thank you, Mr. Stovall.

Additional questions of the witness?

MR. LOPEZ: Mr. Chairman, if I might have just one more question --

MR. LEMAY: Mr. Lopez.

MR. LOPEZ: -- following up on Mr. Stovall's here.

RECROSS EXAMINATION

BY MR. LOPEZ:

Q If and when the restrictions in the Gavilan-Mancos are lifted, isn't it true, Mr. Mueller, that the Mesa Grande proposal is more flexible and could accommodate administratively the lifting of the restrictions in Gavilan-Mancos, whereas, Sun's proposed formula could not?

A Are you asking if Mesa Grande's proposal is more flexible?

Q Yes, administratively than would be Sun's.

A No.

QUESTIONS BY MR. LEMAY:

Q Mr. Mueller, I have one question. Assuming -- your testimony seemed to be that any formula, incremental or percentagewise, is not going ot really materially affect the wells that are currently drilled in the buffer zone. You gave a couple exceptions but by and large that was, as I understood the thrust of your testimony, and you also mentioned that Sun owns acreage on both sides.

Assuming that the Commission felt that a

buffer zone allowable should be addressed, would that allowable in the buffer zone affect Sun's decision to drill a well in the buffer zone, but because it seems like we're also addressing expectation with new wells as well as what is in that buffer zone today?

A I don't think it would affect Sun's decision as much because we've shown that top allowables don't mean anything. You have to do a well evaluation, you know, judge it from offsets and things like that, which we've shown those offsets aren't top allowables, but I believe they are economical wells.

Q But isn't it true that in this area, that you can drill a top allowable well next to a marginal well and and vice versa, so there is the possibility of drilling a good well in that buffer zone which could be curtailed. I'm assuming that would be a possibility, just because that's the nature of -- of our business, and I wondered if that allowable would have any effect, material effect, on Sun's decision to drill in the buffer zone.

A If we drilled a top allowable well or --

Q Well, if you contemplated drilling, is the allowable a factor you would consider in contemplating drilling in the buffer zone?

A Sun feels that this top allowable situation would not affect our decision on drilling a well in the

buffer zone area.

Q Thank you.

MR. LEMAY: Additional questions or some redirect, Mr. Kellahin?

MR. KELLAHIN: No, sir.

MR. LEMAY: If not, the witness may be excused.

Do you have additional witnesses, Mr. Kellahin?

MR. KELLAHIN: Yes, sir. I'd like to call Mr. John Roe.

JOHN ROE,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is John Roe and I'm the Engineering Manager for Dugan Production Corporation.

Q Mr. Roe, you'll have to speak up. We don't have a microphone today.

Have you previously testified as a petroleum engineer before the Oil Conservation Commission?

A Yes, I have.

Q And are you familiar with the production in the Gavilan-Mancos as well as the West Lindrith Pools?

A Yes.

Q And does Mr. Dugan, or Dugan Production Corporation, have an acreage position in the Gavilan-Mancos Pool and the buffer area that's the subject of this hearing?

A Yes, sir.

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

MR. LEMAY: His qualifications are accepted.

Q Mr. Roe, you have -- I have placed before you what is marked as Dugan Exhibit Number One. Does this represent Dugan Production Corporation -- Company's position, as well as your own personal opinion, with regards to the buffer issue?

A Yes. The letter that I have dated November 17th represents Dugan Production's position.

Q I won't ask you to read the letter, Mr. Roe, but I would ask you to summarize, first of all, what your position is with regards to the necessity as you see it for a buffer -- top allowable buffer gas allocation across

this area.

A Primarily, Dugan Production has acreage in both -- in what would be involved in the buffer zone on the Gavilan Pool side and we also have acreage within and adjacent to what would be the established, or what we're considering as a buffer zone on the West Lindrith side.

We have looked at the production statistics in both the Gavilan-Mancos Pool and the West Lindrith Gallup-Dakota Pool. We've made an effort to -- there's -- there's no way to look at every well in West Lindrith Pool in the time we -- we did, other than looking at it on a per well average and looking at many of the wells that are of specific interest on an individual basis.

We found very few wells on the West Lindrith side that even approach producing at rates that equate to what is the top allowable for the West lindrith Gallup-Dakota Pool.

Q When you compare the actual production between West Lindrith and Gavilan-Mancos, what is your opinion about any producing advantage towards one pool or the other?

A As with reference to a graph that Mr. Mueller had, which would be page 8 in his exhibit book, which presents this information better than I'm probably going to be able to say it, but primarily, the wells within

the Gavilan-Mancos Pool are quite a bit higher productivity on a per well basis.

Now, again, there are wells within the Gavilan-Mancos Pool that are not as good as other wells, just like in West Lindrith there are a few good wells that really stand out.

But from the standpoint that the total pool production is approximately, currently approximately what the total poolproduction for West Lindrith is, and from the standpoint that on an overall average the wells within Gavilan are of a much higher productive nature, based on their actual production performance, if any drainage is occurring, it's likely occurring from the direction of West Lindrith into Gavilan, primarily because of the higher pressure sink that we're able to create with the higher rates of production.

Q Do you believe that will continue to exist notwithstanding the fact that there is the opportunity for four wells to be drilled in a section on the West Lindrith side as opposed to one or two on the Gavilan-Mancos side?

A I feel that because of the -- the fact that we have wells with higher productivity in Gavilan indicates to me that that portion of the reservoir is -- is more highly fractured, which is what I feel to be the

primary factor in having a -- or of a well's productivity. So the greater the fracturing, the higher your productivity and the average higher production rate per well in Gavilan definitely infers the Mancos interval in Gavilan is of a much more -- it's more highly affected by the natural fracturing than the acreage in West Lindrith, and so you could drill many, many wells in West Lindrith; in fact, several of the operators, Conoco, Cotton, I think Atlantic Richfield, has actually gone in and infilled many of their 160-acre patterns and have not actually established an increased rate of production for that pattern. The per well average actually decreased. And so I -- I think no matter what you do, even drilling on forties in West Lindrith, you will not be able to establish a production rate that would compete with the production rates that exist in Gavilan.

Q Do you have an opinion, Mr. Roe, as to whether or not Mesa Grande's proposed top gas allowable buffer allocation is one that's fair and equitable?

A It -- from, simply from the standpoint that it does not allow a similar percentage increase relative to the neighbors; no matter where you're at, whether you're in West Lindrith, the West Lindrith buffer zone, the Gavilan buffer zone, relative to the neighbors on each side of you, your allowable should be in a relative manner to each, each of your neighbors, and so from the standpoint

that you go from Gavilan into the Gavilan buffer zone, you have 179 percent increase in top allowable; then you go from the Gavilan buffer zone into the West Lindrith buffer zone, that percentage is -- is much lower, and so the acreage that exists between the Gavilan buffer zone and Gavilan will then be basically somewhat at a noncompetitive position with respect to what the West Lindrith buffer zone with respect to West Lindrith.

Q Let's talk about the issue of the commingled production in the Dakota and Gallup in the West Lindrith Pool. That is obviously an issue in however you aanalyze the West Lindrith production. Do you have an opinion or a suggestion or comments on how to make an allocation of production in that pool between those two formations?

A I have studied that issue in great detail prior to have the original Gavilan Pool rules hearing in early 1984, because at that time we were looking at how significant would the production be in the Dakota versus the Mancos within the Gavilan Pool area, and at that time I -- I really dug into what is the Dakota versus what is the Mancos in the West Lindrith Gallup-Dakota Pool.

Prior to having the West Lindrith Gallup-Dakota Pool established, there was some testing of the Dakota formation. There was some individual completions in the Gallup formation, and after the pool was established, I

don't remember the exact time frame. I have it if it's necessary, but Conoco did quite a bit of additional testing to establish what -- how significant is the Dakota. In the better part of the West Lindrith Gallup-Dakota Pool, based on Conoco's test data that it's my understanding they did present to the Commission and should be available in Commission records, that something in the range of 70 percent of the total production, gas and oil, could be attributed to the Dakota. The Dakota, based on log analysis and actual tests in the main part with the West Lindrith Gallup-Dakota Pool, is the primary producing interval.

Q Where is the main part of the producing Gallup -- producing Dakota area in the West Lindrith Pool? How far away is that from the boundary with Gavilan-Mancos Pool?

A It would be in the western edge of Range 3 West and Range 4 West, in that area. It's five to six, seven, eight miles, depend on whether you go to the edge or go to the center.

The West Lindrith Gallup-Dakota Pool is a very large pool and covers a very large area, so it's very difficult to say yes, 70 percent of the production is coming from the Dakota everywhere. In fact, there has been a well drilled recently in the row of sections that is adjacent to what would be a buffer zone. It would be in the easternmost

row of sections. It would be ARCO's Gardner 13 Well No. 1. This particular well is located in the southwst quarter of Section 13 of 25 North, 3 West.

Dugan Production has an interest in that well and we followed that well very closely. Based on ARCO's experience in -- in West Lindrith, their primary objective in that well was the Dakota. Their initial completion plans had nothing to do with the Mancos. They were hoping that the Dakota would be their major completion and for the first six months that that well produced the production was solely from the Dakota.

The well was first placed on production in December of 1986 and during May of 1987, after having produced for six months, the Dakota was averaging three barrels of oil a day with an average GOR of 2279. During May ARCO temporarily abandoned the Dakota perforations, completed the Mancos formation, and in the four months that I have production data, the Mancos average during September, after having produced for a full four months, was 30 barrels of oil per day up to 9536 GOR.

Now there are other wells within this row of sections that we have this kind of information on that -- that to me it's really not important how important is the Dakota to West Lindrith, because we're talking about a pool that the Dakota generally is more significant than we find

in Gavilan. The wells that we have individual test information on in what would be close to the buffer zone but on the West Lindrith side, says that the Dakota is just like it is in Gavilan. The times we've tested the Dakota in Gavilan it has been a very low rate oil reservoir, in the range of 5 to 6 barrels of oil per day and a gas/oil ratio similar to what we -- I just mentioned with the ARCO Gardner Well.

Based on log analysis the Dakotas look very similar in the completions that we've actually got information on, and I do have other information, other than the ARCO well, it's just not quite as at my fingertips but we could present that.

Q Let me ask you about the issue of comparing the way the Division or Commission has established rules between West Puerto Chiquito Mancos and Gavilan Mancos, and contrast or compare the similarities and dissimilarities that occur between West Lindrith and Gavilan-Mancos.

First of all, on the issue of a top gas buffer allowable, is such a concept, is that concept in place between the West Puerto Chiquito Mancos and the Gavilan Mancos?

A Initially there was a disparity in the top allowables that existed between West Puerto Chiquito and Gavilan; however, through some of the hearings, and I don't remember which one, but the operator of the Canada Ojitos Unit requested that the allowable in the Canada Ojitos Unit,

or West Puerto Chiquito Pool, be made equal to both oil and top allowable gas to what exists in Gavilan, and that is the current status of the allowables, is there is no buffer zone with respect to gas or oil between Gavilan and West Puerto Chiquito.

Q When we look at West Lindrith and Gavilan-Mancos, if you address the buffer allowable issue, what is your position with regards to well locations on each side of that boundary line?

A Are -- are you referring to the distance from the outer line?

Q The distance from the outer boundary, yes, sir.

A The Gavilan is -- is being developed with a required distance from the outer boundary of 790 feet.

Northeast Ojito has that requirement of 790 from the outer boundary. It's being developed on 160-acre spacing, and with reference to the map that's attached to my letter, you can see the proximity of the Northeast Ojito Pool. It's the pool outlined in green.

The Gavilan I did not highlight its boundary, but it's -- it is indicated there with the fairly wide, heavy dotted boundary line.

And those two pools have 790 and generally pools that have spacing of 160 acres, the statewide gas

spacing, uses the 790 feet. The only times we've run into the 330 foot, which exists in West Lindrith was when you were anticipating 40-acre development.

So we feel, in order for Gavilan and Northeast Ojito, should there be additional development in that area, it would be important that that development, future development, in West Lindrith be done in a manner that is compatible with the offsetting wells in Gavilan or Northeast Ojito.

Q In conclusion, Mr. Roe, do you see an immediate need for the Commission to adopt a top gas allowable buffer allocation simply because at the current time there represents a difference between the top gas allowable that's allowed in West Lindrith as opposed to that allowed in Gavilan-Mancos?

A No. I see no reason. In fact, this whole issue of -- of what is the top allowable for West Lindrith is -- has, I think, become rather blown out of proportion. As we've indicated with Sun's testimony, most of the wells in West Lindrith have never been, and again we researched back to the early time of production. The pool was discovered in 1959, so we have gone back trying to not be guilty of just looking at later production and a mature field. There really haven't been many wells that were able to have a top allowable, so the top allowable in West Lin-

drith is really higher than, and has been higher, than we've ever needed.

Q Based upon your review of the records of the Commission, can you tell us which, if any, of the wells on the West Lindrith side of the current boundary were permitted pursuant to Gavilan-Mancos spacing dedications? Were there any?

A Yes. There -- because the Gavilan-Mancos Pool rules require that initial development be -- or that any well within a mile of its boundary be developed according to the Gavilan-Mancos Pool rules, the Gardner Well in the southwest quarter of Section 13 of 25, 3, and a Reading & Bates well in the northeast quarter of Section 24 of 25 North, 3 West, were both drilled with the 320-acre Gavilan-Mancos spacing unit established or set out for that drilling.

Would that -- would that --

Q Yes, sir. Do you have an opinion as to whether or not the occurrence of drainage across the pool boundary is an issue better resolved on a case-by-case, well-by-well issue between those operators across the pool boundary or whether or not it is better for the Commission at this time to try to establish some generic allocation of rules between the two pools?

A Right, right now, with the data that we

have, looking at roughly 8 wells that are in the West Lindrith side of -- or in or adjacent to the West Lindrith side of the buffer zone, and looking at some of the wells along the eastern edge, or the western edge of Gavilan, it does not appear to me that we need to change the allowables for the existing development. It -- in the event that an anomolous well is drilled and completed on either side, I think that it would be appropriate that that issue is dealt with at that time, yes.

Q In response to the hearing today, do you have any other further comments or opinions you wanted to express on the buffer issue that's before the Commission today?

A I -- I can't think of any additional.

MR. KELLAHIN: That concludes my direct examination of Mr. Roe.

MR. LEMAY: Thank you, Mr. Kellahin.

Cross examination. Mr. Pearce?

MR. PEARCE: No questions, Mr. Commissioner, thank you.

MR. LEMAY: Mr. Lopez?

MR. LOPEZ: Yes.

CROSS EXAMINATION

BY MR. LOPEZ:

Q Mr. Roe, if I understood your testimony correctly, you favor a buffer zone between the two pools, the Gavilan and the West Lindrith, solely for the purposes of setback requirements for well location (inaudible to the reporter.)

A Well, I don't think I said exactly that, but that summarizes my feeling, yes. I think my statement, if it wasn't, I meant it to be, is that right now pooling with the top allowables in the manner that we're talking about, is going to have very little effect on any of the wells we're talking about. The fact that it will establish two allowables in two pools, I think probably there is some contradiction to what the -- the rules and regulations of the Oil Conservation Commission allows. In other words, I'm not really sure that we can have two allowables in -- in a pool, but with the wells we have, I don't see a need to change the allowables because the wells we're dealing with are not of a quality that they are capable of producing the top allowable.

Q All our problems would be removed, wouldn't they, if the Commission removed the restrictions in the Gavilan-Mancos?

A Well, you've been involved with this case as long as --

MR. LEMAY: I don't think we'll entertain a collateral attack on our ruling.

A Well, I had an answer.

Q Well, moving along, do you agree with Mr. Mueller's testimony that there is very little development along the proposed buffer zone in West Lindrith?

A That is correct. In fact, of -- I counted of the 12 spacing units that would be in the West Lindrith side of the buffer zone, as we're talking about it now, there is developmetn in only 4 of those spacing units.

The -- on the Gavilan side of the buffer zone, identifying spacing units is not quite as easy, because the Commission has on its own motion established four of the rows of sections, they've set up nonstandard units, which are approximately 505 acres per spacing unit. Of those four, two of them have been established with production; one of them has a well planned for drilling; and one is -- is -- has, to my knowledge, no plans to drill yet.

So of the four 505's, two of them are developed and two of them are undeveloped.

There is an additional two sections that are nonstandard 187-acre sections, and of those one of them is developed. So there's a higher density of development on

Gavilan side than there is at West Lindrith, yes.

Q So in point of fact, we don't know what those wells are going to look like until they're drilled, do we?

A That -- that's exactly right and that's why we feel probably the data that we have now, which does surround this area, does give us a suggestion that we're not going to have Gavilan quality wells in this general area, and that's established by wells on Gavilan side plus wells on the West Lindrith side.

Q Well, do you agree with Mr. Mueller that the boundary that we're living with is one for administrative convenience only and doesn't necessarily represent the geological boundary?

A I -- that general statement, I need to qualify just a little bit there.

I will acknowledge that somewhere West Lindrith and Gavilan will have to -- one of two things is going to have to happen. Either we're going to have allow the two pools to adjoin each other or we're going to have to abolish one pool and make one massive, large pool.

Now, from one of the questions Mr. Kellahin asked early, I don't think it's appropriate to abolish West Lindrith, one, because I think it would be impractical. The very first case we had today dealt with royalty owner

notice and I would -- I personally would not want the task of identifying and notifying everybody that needed notice to change the pool rules on either Gavilan or West Lindrith. So it to me is an impractical thing to do anything other than allow the two pools to abut up against each other.

Now, when you allow a pool spaced on 640 acres to adjoin a pool spaced on 160 acres, you're going to have problems at that meeting no matter where that boundary is drawn. We, we being Sun and Dugan Production, and I think I can speak for Sun in this matter, agree that a place we already have a problem dealing with sections because of the survey, the short sections, the small sections, roughly 190 acres per section, that exists on the west edge of Gavilan, is a convenient place for this to happen.

I am unaware of any pressure data that would tell me that that is a geologic end to Gavilan and in other words, there's no information that I'm aware of that tells me the reservoir stops at the range line.

So if we acknowledge the pools have to abut, then we might as well do it at a place that we have a problem to start with, and that is the -- the acreage problem.

Q Is what I hear you saying is that you recognize that wherever it's going to abut, it's going to create a problem but we're not going to address the problem

because we're not going to put a buffer zone so we can equalize the treatment on both sides of this imaginary boundary, much along the lines that we've been discussing, and the line of cross that I put to Mr. Mueller about there being four wells on one side of an imaginary boundary and only two on the other side?

A If your question was did I say all that, no, I did not.

Q Okay. I think you stated that in your study of the West Lindrith you said that in the center part of West Lindrith, that you stated was 6 or 7 or 8 miles away from this boundary we're discussing, that the primary production was in the Dakota.

A The Dakota is much -- yes, the majority of what from the testing we have access to -- now I might note that since the pool was established there really has been very little testing selectively because once the pool was established as one common pool, there was no real need and nobody wanted to spend the extra money to test.

Q And then I think you addressed the ARCO well and indicated that it initially produced from the Dakota and then that was plugged off and now it's producing solely from the Mancos, and that well is near the buffer zone, I believe.

A Yes.

Q And would this suggest to you that this well is performing more like a Gavilan-Mancos well than a West Lindrith well?

A Based upon the production information we have, which is all we've got right now, or all I have access to, and as a working interest owner in a well I would like to think that that's all that exists, we -- we can say that the productive character of the -- this well is similar to Gavilan, but we can go even further into West Lindrith and find wells, specifically in Section 32 of 25, 3, drilled by Joseph Poole, or Hixon Development in Sections 33 or 34 of 25, 3, that produced over 1000 barrels day, which that's a Gavilan type well, also.

So we're dealing with the kind of reservoir that the kind of well you get is going to be influenced by the fracturing that you see in the reservoir, and we can definitely say that the fracturing tendency, that the fractured nature of the reservoir deteriorates as you move to the west. That's evidenced by the fact that Conoco tested in their main part that the Dakota is much more productive than the Mancos, or what they call Gallup.

It's evidenced, you know, I just listed the ARCO well. Curtis Little in -- in their well in the northeast quarter of Section 1 tested the Dakota, and it's my understanding, at least based upon a report on file with

the Commission that during August after testing only the Dakota, the Dakota at that location in Section 1 of 25, 3, was temporarily abandoned because it was uneconomic, and that, I mean, that basically came off of their form.

So what we know about the Dakota in this area is that it's not that productive. It's more similar to what we see in Gavilan.

Q So that might suggest, might it not, that we would in this undeveloped buffer zone on the eastern flank of the West Lindrith be more likely, hopefully for everyone's benefit, to encounter wells more like those in Gavilan due to the fracture system?

A It's possible, yes. In other words, as I said, I -- there's really nothing magic that happens at the range line that tells us Gavilan ends. We've just picked that because it is a place we have to deal with a spacing problem that we have no control over.

Q And doesn't this suggest to you that the situation here on the western boundary of Gavilan is no different and naturally identical to that that it experiences on its eastern flank where it adjoins the Canada Ojitos, and where you stated that you didn't think it was a buffer zone but I think the administrative record is clear there does exist a buffer zone between the two pools. The only difference between that area and the area on the western flank is

that the spacing, setback requirements, and producing rules between -- in the buffer zone on the eastern flank are identical between the West Puerto Chiquito and the Gavilan-Mancos.

MR. KELLAHIN: I'm going to object to the question, Mr. Chairman. I think it's unintelligible. I don't know what the question is to the witness. I don't think it's fair.

MR. LEMAY; It's a little complicated. You might just ask it a little more simply.

Q What is your understanding as to the existence of a buffer zone between West Puerto Chiquito and the Gavilan-Mancos Pool?

A Okay, I, unless I'm grossly misinformed, the special pool rules in West Puerto Chiquito do have the words "buffer zone" as part of them, but what happens in the buffer zone in West Puerto Chiquito and Gavilan has nothing to do with allowables unless you're closer to the range line than 1650 feet or 2310 feet, I don't remember which, but then if you have your well located closer to range -- the meeting of Range 2 and Range 1, then you cannot produce more than 50 percent of the 640-acre top allowable. And that's the only restriction of production, but that top allowable for 640 acres in West Puerto Chiquito is 800 barrels a day and the limiting GOR in West Puerto Chiquito is 600, just

like exists in Gavilan.

Now the only other thing, there is also probably the words "buffer zone" in Gavilan, also, but all that says is that in the east half of the sections that butt up against the meeting of Range 1 and 2 West is you can only drill one well in that east half and it also has the similar allwoable restriction if you were closer to that line than, like I say, I don't remember the number, it's either 1650 or 2310.

But there is no disparity in allowables between West Lindrith and Gavilan -- between West Puerto Chiquito and Gavilan. Now if you want to deal with that issue, the allowable in West Puerto Chiquito was reduced to match -- it came from a higher level of around 1200 barrels of oil per day per 640, in order to prevent an interference problem, which is probably of greater concern on the eastern edge because I mentioned earlier, as you move west the productivity nature -- the fractured nature of the reservoir diminishes, so the concern of interference between pools is much greater and we have actually demonstrated that interference with pressure pulse testing, and again, a large part of that interference data was presented in earlier hearings that dealt with West Puerto Chiquito.

So I don't really see that what exists on the eastern edge of Gavilan is the same problem that exists

on the western edge of Gavilan, but if we want to solve it in the same manner, we could reduce the allowables in West Lindrith just like we did in West Puerto Chiquito, such that what's happening in Gavilan, and don't misunderstand me, Gavilan, the reason the allowable is low is not because we have a magic handle on what the allowable should be. It's that we think there's some serious things going on in the reservoir. There is not a common agreement of what is happening and we wanted the extra time to arrive at an optimum method to produced Gavilan. It's a reservoir that has high productivity. There's been demonstrated a lot of hydrocarbons in that general area that may not be recovered if we produce it at a higher rate.

So it's true, Gavilan is restricted, but it's for a good reason.

Q Well, I think you've answered my question which was does there exist a buffer zone between Gavilan-Mancos and West Puerto Chiquito, whether it's a 1650 setback or 2310 setback, as you indicated, and isn't it true that any well drilled on either side of that eastern boundary has the same requirements with respect to producing characteristics and location?

A Yes, that is. That is true.

Q And so that solves the problem for that side of the -- of the pool, correct?

A That's correct.

Q We don't have a similar solution unless we adopt the ones suggested by Mesa Grande or Sun's for the western boundary, do we?

A Well, the big difference is in West Puerto Chiquito and Gavilan we have wells that -- in the eastern edge of Gavilan, that are top allowable. There's -- there's a well in West Puerto Chiquito produced 50,000 barrels a day based on pressure measurements.

There are wells in the eastern edge of the Gavilan and in the center of Gavilan that have produced over 1000 barrels a day. We don't have that quality of wells that we're dealing with as we move westerly in Gavilan and into West Lindrith and we're dealing with wells that won't produce even close to what the top allowables are.

Q Well, yeah, we're -- the point is, though, if the wells on both sides of the western boundary of the Gavilan-Mancos Pool have identical producing characteristics, whether they produce 1000 barrels a day or whether they produce 200 barrels a day, and the fact that the wells in West Lindrith can exist four to a section where in Gavilan they can only exist two to a section, and where in Gavilan they're already restricted on their production rates, where in West Lindrith they are not, where in Gavilan they have greater setback requirements than they do in West

Lindrith, how can you say that in a situation like that there wouldn't be a great effect on correlative rights without some sort of buffer zones formula solution?

A Well, with respect to the setback, we agree they should be the same.

With respect to the protection of correlative rights, I think we -- the Commission needs to deal with that issue such that correlative rights can be protected.

I think our position is, and again, if we drill a well in the buffer zone and find that it winds up to be of a nature that it will drain the offsetting acreage in Gavilan, in other words, one well on a 640 or two wells on a 640, which is allowed under the pool rules, or two wells in the 505, that is allowed under the pool rules, if two wells in Gavilan will not effectively protect themselves from drainage that exists from four wells in West Lindrith, which the study I've done I feel that Gavilan's wells have the ability to protect themselves from drainage, because -- not because there's that great a wells on the western edge of Gavilan, but the wells on the eastern edge of West Lindrith aren't that good.

Q Well, we don't have any wells in the buffer zone, do we, so we don't know what we're talking about here.

A Well, we do have some wells in the buffer zone and the information we looked at tells us that the -- this part of the reservoir is going to be similar to the wells that are adjacent to the buffer zone that we have looked at, and so you're right and this true no matter where you're at, until you drill your well, you're not going to really know, and in this kind of a reservoir that's really true, moreso than normal.

Q And you would rather do this on a case-by-case ad hoc basis without having any rules of the game established for an area that is undeveloped so operators in West Lindrith can go ahead and risk their resources in trying to develop wells in the so-called buffer zone, and then after they've got a good well, then be shut back without knowing what the rules of the game are going in.

A Well, Mr. Lopez, I, probably more than anybody, would not want that, and we, the last two years we've spent in Gavilan dealing with just that issue.

I'd say that anybody that drills a well in the West Lindrith side right now with allowables unaffected, in other words, ought to be aware that if they wind up with a well that is exceptionally good, that they're going to probably have to have some sort of arrangement either with offset operators in Gavilan that is done cooperatively or we will have to come to the Commission and ask them to

help.

Now, I would hope that there's nobody here or in West Lindrith that is unaware of that potential problem. All as we're saying is that for you to change an allowable in a manner that really is not going to be effective on any of the wells, or very few of the wells, that it affects right now, it just doesn't make sense that we would change it and there's no basic effect. Our primary reason for changing it is in anticipation that we might get a good well.

The people in the West Lindrith side are very adamantly opposed to a buffer zone, and I understand that, but people in Gavilan would love to produce the reservoir at higher rate and I'm one of those people if I felt that there wouldn't be damage to Gavilan as a result of that, and maybe someday we'll make that determination and Gavilan's allowable will be restored and there won't be a problem, but for right now I don't see that we have the information that's necessary to tell us that we've got to change the pool rules and then if we do change it and, again, both Sun and Dugan Production support or have supported an allowable if the Commission recognizes the need to set up a buffer zone with the belief that that will aid in protection of correlative rights.

Q And the suggested formula that Sun and

Dugan support in the event of a buffer zone would have a greater adverse effect on the production of West Lindrith, wouldn't it?

A No, it won't.

Q Could we turn to Sun's exhibit, I think it's on page 20. It's page 20 and if I understand this exhibit correctly, this equal increment bar is according to the formula suggested by Mesa Grande at the original hearing on this case.

A Yes, yeah, he has both cases presented there.

Q And then the equal percentage is that produced by Sun, as recommended by Sun.

A Yes, that is.

Q And so if I understood this exhibit correctly, according to the equal increment formula, both the Gavilan buffer and the West Lindrith buffer would be allowed to produce at greater allowables than would the Sun proposal because the Sun bars are shorter than the Mesa bars.

A Well, Mr. Lopez, I misunderstood you. I thought you said would the production be affected.

You are right, the allowables will be affected greater -- there is as much difference in allowables, but I might also point you to page 6 and page 8 of Sun's exhibit and the primary purpose of this exhibit was to show

that on a per well basis even Sun's allowable, which has the greater effect, still doesn't affect anything and on a per well basis in Section 3 Mr. Mueller had individual wells that he tried to point this out, that there really aren't very many wells that are affected by the top allowable, and that's primarily our position. You're changing something in a manner that's -- the only time it's going to affect an operator is if the Gavilan operator wants to drill a second well, he probably isn't going to have all the allowable he'd like to have.

Q These exhibits on pages 6 and 7 didn't include any wells in the buffer zone in West Lindrith, did they, except the Section 1 well, the Section 1 well --

A Well, bearing in mind that the buffer zone in West Lindrith, there -- yeah, that's right.

Q Okay.

A But again I'd make reference to Section 3 that does include wells in the buffer zone and adjacent to the buffer zone, and so even though they weren't included in these two pages, they are included in Section 3 on roughly ten different graphs.

Q Do you support 460-acre spacing in the West Lindrith in the buffer zone?

A Yes, I do. Well, --

Q Okay.

A -- let me qualify that just a bit. The fact that it's in West Lindrith, I support the 160-acre spacing. I have really not any information to tell me that 160 acres is the proper spacing for that area.

Q Then you have no opinion.

A No, I have an opinion. I -- it's in West Lindrith and we support that being the boundary and because of that reason we support the 160-acre spacing, but I have no engineering information to tell me 160 acres is the proper spacing, and it's my thought that the operators may find that they don't need two wells per half section to develop that acreage, but that is something the individual operators of that acreage, and that does include Dugan Production, will have to sort out for themselves.

Q Now, turning to the first full paragraph on page two of your Exhibit One, maybe I can get you to give me the answer that I couldn't get across to Mr. Mueller.

Your second full sentence there says, "This would result in adjusting the allowable in each area, moving from one pool, into each buffer zone, and into the adjoining pool by a factor of 1.8534, rather than a constant volume of 429.34 MCFD + 121.33 BOPD for each 320 acre tract of land," comparing your -- or Sun's proposal to Mesa's.

Isn't it true that if, in the event the restriction allowables in the Gavilan are lifted, that a

great deal of administrative ease would result by adopting the Mesa proposal rather than the Sun proposal because ours is based on a constant rather than on a percentage factor?

A Well, I don't agree with that. I think it depends on what it's easier for you to do. If it's easier for you to have, yes, Mesa Grande's formula and the formula that describes that, and that formula is outlined -- I'll find the page -- but Sun, I believe, did have a formula that would be useful in computing what the allowables should be under their proposal and it's true their formula requires a different mathematical operation, but that's simply all it is, and I do think that my calculator will handle Sun's proposal.

Q Will the 1.85 factor work if Gavilan is restored to statewide allowables?

A If Gavilan is restored to the statewide allowables, we -- I don't know. I'd be happy to go through that calculation and see, but I think it will, yes.

MR. LOPEZ: No further questions.

MR. LEMAY: Mr. Stovall, any questions of the witness?

MR. STOVALL: Well, I've been waiting for a long time to cross examine Mr. Roe, and I can't pass it up, Mr. Chairman. I will try not to make

closing arguments in my cross examination, however, Mr. Chairman.

MR. LEMAY: Please don't. We have time set aside for that.

CROSS EXAMINATION

BY MR. STOVALL:

Q I'd like to deal, Mr. Roe, quickly with one issue that Mr. Lopez has brought up a number of times with you and Mr. Mueller, with respects to the characteristics of the boundary between Gavilan and West Puerto Chiquito and the characteristics of the boundary between Gavilan and West Lindrith. Are they similar? Do you have similar problems with regard to the boundaries in the two sides of Gavilan?

A Well --

Q Have you established by evidence and knowledge, engineering knowledge, and existence of a similar problem across the boundaries?

A Yes. We have actual pressure measurements and a great deal more information to say that West Puerto Chiquito and Gavilan are in fact connected and what happens on one side beyond any doubt will have an affect on what's on the other side. We -- we don't have similar reservoir characteristics on both sides of the reservoir,

though, and that is the primary difference of why we don't support having an allowable change in the buffer zone or the adjoinment (sic) of West Lindrith and Gavilan as we do to the east.

Q What I hear you saying, if I understand the last part of your statement, is that the reservoir characteristics on the west side of Gavilan are different than they are on the east --

A Yes.

Q -- and the nature -- and there's not as much difference between West Lindrith and Gavilan significantly, but there is a great deal of difference in the nature of the reservoirs as opposed to West Lindrith and -- I mean, excuse me, Gavilan and West Puerto Chiquito, in that there's established communication between Gavilan and West Puerto Chiquito and not between West Lindrith and --

A I think I got bogged down with --

MR. LEMAY: I think you're giving closing arguments, Mr. Stovall.

MR. STOVALL: Let me drop that.

MR. LEMAY: I believe if you ask him a question he may be able to answer it.

Q Don't bother to answer the question, Mr. Roe.

Recognizing that there was a problem in

the Gavilan - West Puerto Chiquito boundary, the solution adopted there was a change in the pool rules throughout the entire West Puerto Chiquito Pool to conform to the pool rules in the Gavilan Pool, is that not correct?

A Yes.

Q In other words, the rules within West Puerto Chiquito are the same throughout the pool. They don't vary depending on your location in the pool.

A That is correct. Well, with the exception of the buffer zone.

Q The pool rules -- the pool rules are uniform for the most part.

A Well, the only difference is the spacing requirement if you drill in the western -- if you drill close -- there is a difference in location requirement in what is identified as a buffer zone.

Q Okay. In -- in Gavilan, I think that we've heard that the problem is largely a result of the reduction in allowable from what would be the statewide allowable and you are familiar with the Gavilan situation, are you not?

A Yes.

Q What is basically, looking at the Commission's reason for being, that is the prevention of waste, protection of correlative rights, what is the reason fore

the reduced allowable, in your opinion, in Gavilan?

A Well, I was actually a party to the application that -- as were you, that resulted in the allowable reduction, and the reason we asked for it is -- is we felt that we needed some time to resolve to ourselves what was the best way to produce Gavilan, being cognizant of the fact that we had established that it was communicated with -- and this isn't totally agreed to by everybody, either -- but some of us felt that we were in pressure communication with a long established pressure maintenance project, and the operational practices in the West Puerto Chiquito Pool were to be in a manner that we didn't just flow the wells all that they'll go, the production -- and Dugan Production has an interest in West Puerto Chiquito, so I have a good handle on that information. We were trying to operate West Puerto Chiquito in a manner with -- that we felt would maximize ultimate recoveries.

Q Is that prevention of waste, then, or is that the primary concern --

A That was --

Q -- in the West Puerto Chiquito production mechanism and the imposition of restrictions in Gavilan.

A Right.

Q And you've identified a change in the producing mechanism of the reservoir across Gavilan to the

western edge in the West Lindrith, is that correct?

A No, not producing mechanism.

Q Well, perhaps I used the wrong engineering term. In the -- in the nature of the reservoir?

A All right, its ability to produce, yes. We, as we move westerly for West Puerto Chiquito, the wells that we've seen do get -- appear to be less and less influenced by natural fracturing as you move from West Puerto Chiquito into West Lindrith.

Q If there were to be a buffer zone or some adjustment of allowables established in let's call it a buffer zone for lack of a better term, would you recommend -- and considering that West Lindrith is a Gallup-Dakota Pool, would you recommend testing on each well developed in the buffer zone to determine how that buffer allowable should be applied?

A Well, working for a company that we have a very strong emphasis on controlling costs, I probably would lean towards -- primarily because, one, I don't think the Dakota in this area is -- is of any significance -- I would lean towards putting the well on production and if actual performance demonstrates that it's a better well than necessary, then if testing is the only way to resolve the difference, then, yes, I think testing should be required, but to cause that as a requirement up front, I'm opposed to

that, I think, because that would greatly increase the costs and the data we have right now says that may not be necessary.

MR. STOVALL: I have no further questions of the witness.

MR. LEMAY: Thank you, Mr. Stovall.

Any additional questions of the witness?

MR. HUMPHRIES: I might ask a few.

MR. LEMAY: Yes, sir.

QUESTIONS BY MR. HUMPHRIES:

Q Mr. Roe, I apologize, I'm never sure who I want to ask a question to. It's usually whoever's there when I finally figure out what I want to ask.

Do I understand you right then to say that as far as you're concerned the (unclear) of Sun's formula would increase production allowables -- or the application of Sun's formula would increase -- excuse me, not Sun's formula, Mesa Grande's formula -- would increase production for the Gavilan-Mancos wells in the buffer zone if it was applied?

A Yes, sir, it would definitely result in

an increase in the top allowable of a well in Gavilan-Mancos buffer zone, in other words, and it would be a number that would be higher than you would compute using Sun's formula.

Q Okay. Did you understand you right to say you do not see a geologic boundary near or in the buffer zone?

A I -- I mean to say that we don't have the information that tells us that such a boundary exists. We, I think probably one of the best ways to make that determination would be with a pressure test of some sort and as Mr. Lopez pointed out, there really aren't a lot of wells there yet.

Now there are some wells that we could -- could test, but we don't have any information geologically that tells us there is something that happens at that point.

Q Well, I was happy to hear Mr. Lopez say that the buffer zone solved the problem between West Puerto Chiquito and Gavilan Mancos but I don't know if that would be permanent in its nature or just temporary in his question, but let me go on to --

A Well, let me comment on that because when he asked me about that, there is no buffer zone with respect to allowables.

Q I understand, but I also think he was not being (unclear).

MR. LOPEZ: I admit I overstated my case.

Q Although I wish you were correct, the way I understand it, the question about the buffer between West Puerto Chiquito and Gavilan-Mancos has been a difference in A, B, and C zones of a Mancos characteristic known as the Niobrara. Is that right? And the argument as to which side of a buffer zone West Puerto Chiquito produces from and Gavilan-Mancos produces from.

A Well, it's true that issue has been raised and I and Mr. Greer were neither one very successful in dealing with that.

It is not my belief that that is the problem, no. I think that there's definitely -- that is the position of one side.

Q Okay. I could not recall any entity in the discussion of a so-called barrier between West Puerto Chiquito and Gavilan-Mancos although readily everyone admitted there seemed to be some kind of similarities indicating that the Dakota was involved in there.

A The Dakota, no. The Dakota would -- now are we talking West Puerto Chiquito?

Q Yes.

A Yeah, the Dakota has never really been an issue in that --

Q Okay.

A -- side.

Q Okay, then as we started to talk about Gavilan-Mancos, we started to talk about if the pool, Gavilan-Mancos was behaving in a certain way, some things did not appear to be clear at the west side of Gavilan-Mancos, nor the east side, but the east side seems to more identified than the west side, so in trying to deal with that, then we started talking about something that might be happening out there at the boundary between Range 2 and 3 West, even though that's a geographic not a geologic boundary, we started to talk about some things that were happening out there.

Now I've understood two different things from certain people's testimony, but I think you were the most clear about it. You seem to think that the Dakota production somehow or another transcends Range 2 and 3 West under the Gavilan-Mancos, but is more predominant farther west from Range 2 and 3 and increases as you get closer to Range 4, and you used a figure that some 70 percent of the gas and oil was from the Dakota.

So is the production at Range 1 and 2 boundary more or less Dakota production than it is Gallup or Mancos production?

A Dugan Production is -- it's no better and

possibly worse as you move into West Puerto Chiquito. There is one Dakota completion in the western edge of West Puerto Chiqauito. It was basically -- I'm having to dig back pretty far, but it seems to me like it was potentialed with about one barrel of oil per day and it had a fairly high GOR, and Al Greer, or BMG, was the operator of that well.

There is a proposal within the Canada Ojitos Unit to look at developing the Dakota with the idea that that would supplement gas reserves some day in the future, but the Dakota that we see -- that Dugan Production has been involved with production testing along the eastern edge of Gavilan, has been very poor. In no cases has it been much better than what we see in the ARCO Gardner 13-1 Well. In specific places we've tested the Dakota, we've tested it as far north as Dugan Production's Tapacitos 4, which is in the southeast quarter of Section 36 of 26, 2, and we've tested the Dakota separately as far south in a well that we were serving as -- or as agent for Jerome P. McHugh in the Boynton Lola 1 or 2 in 24 North, 2 West.

Both of those tests, the Dakota was not productive enough that we could justify dually completing the well.

Within Gavilan there are only two Dakota wells that are completed as separate completions, and that's a well operated by Reading & Bates and a well operated by

Mesa Grande Resources.

Those two wells show that the Dakota formation is totally different in that it's basically what we normally think a Basin Dakota pool.

The other places we've tested the Dakota it's more like what we see down in what used to be the Chacon Dakota. It is an oil reservoir and that's what resulted in the Gavilan-Mancos -- or Gavilan-Greenhorn-Graneros-Dakota Pool being established, is predominantly we're dealing with a very marginal, low rate oil well in the Dakota in the times we've tested it, and again I mentioned the two Dugan and McHugh tests, the BMG test in Range 1 West of 26 North, the ARCO well in Range 3 West of 25 North. So the times we've seen it, the Dakota is -- appears to be uniformly marginal in this area, where in West Lindrith the Dakota is a significant part of the total productive interval.

Q So at the west end, east end of West Lindrith, then, are we talking about something, say, the anomaly of a well that behaved like a Gavilan-Mancos Well? Let me ask you, did you say, or I understood you to say and I wrote it down, "We will not see Gavilan-Mancos quality wells in the buffer zone"?

A That's my feeling, yes, sir.

Q So if we saw one, it was an anomaly, maybe it would not be unfair to treat it differently.

A Yes, sir.

Q I have the feeling that we're talking about maybe not a geographic boundary, since -- I mean a geologic boundary, since nature does not necessarily go along with political and administrative decisions, and sometimes the lines get a little blurry, but it appears to me that the production interval that we're the most interested in or the production zone that we're the most interested in in the Gavilan-Mancos appears to be playing out somewhere near the boundary of Range 1 and Range 2, and the production zones that we seem to be the most interested in as the major contributors in West Lindrith, seem to be playing out at the east end of Range 3.

A Yes, that -- I think that's right.

Q Excuse me, I said Range 1 and 2. I should have said Range 2 and 3.

A Yeah, that's correct.

Q As we get to the end of -- the west end of Range 2, we seem to find less and less of the Gavilan-Mancos production ability, at least, demonstrated.

A That is correct.

Q Not that the potential is not there, but the ability seems to not be demonstrated.

A As -- as uniformly throughout the pool, yes, sir, that's correct. As I mentioned, there are a

couple wells in West Lindrith that have been good, but they are truly anomalous and they're further in Range 3 West. I mentioned the Hixon well and Joseph Gould wells, but those wells truly are anomalous.

MR. HUMPHRIES: This is not a question to Mr. Roe but I guess it's a statement to you, Mr. Chairman.

It strikes me that an industry that really seems to abhor regulation brings a lot of things to this Commission to pass regulation on, but in this case it seems to me that maybe there is no need for regulation.

A Yes, sir, I think that's our position.

MR. HUMPHRIES: Thank you, I have nothing further.

QUESTIONS BY MR. BROSTUEN:

Q The only question I would have for Mr. Roe, you've mentioned about that if a well of -- let's say an exceptional well were drilled in a buffer zone that at that point in time the Commission could perhaps take -- take that matter and determine an allowable for that well.

Do you think that -- that the industry, or your company, for example, facing that possibility is going to put a damper on your -- on your enthusiasm to drill a well in that buffer zone with the possibility that at some

point in time the Commission would come in and restrict the porduction of your well?

A Well, I will say that under the existing allowables in Gavilan, Dugan Production has plans to drill two wells. We had a forced pooling hearing on those two just -- just very recently.

I know yesterday we heard Mesa Grande has plans to drill and had a forced pooling on Section 14 of 25, 2.

The allowable that exists in Gavilan has not totally prohibited drilling. It has definitely reduced enthusiasm to go out and drill but Reading & Bates just completed a well that is in the West Lindrith side of the buffer zone. They did that with the understanding that they were going to have an allowable assigned to them that equates -- that is Gavilan. Their spacing unit was, I believe, the east half of that section and it was a Gavilan-Mancos spacing unit.

Now, what we're talking about is so -- so we do see drilling activity going on with the allowable that is in place in Gavilan.

If, either under our formula or under the formula that Mesa Grande supports, either formula will result in a higher allowable being established for the buffer zone in Gavilan, it will, both formulas result in a lower

allowable in West Lindrith, than exists under West Lindrith state rules, but you've got to bear in mind we're going from something that based on gas there's a disparity of about seven times what is in place in Gavilan versus what is in place in West Lindrith, and so somehow we've -- if you're going to set up a buffer zone that goes from roughly a million and a half a day to 400 or a half a million a day, you've got to do it in a -- the million and a half is not right, it's -- on a 640-acre basis it would be about 3-million, so if you go from a half million to 3-million on a 640-acre area under consideration, all we're asking the Commission, that if you feel that there is this need to provide a transition, that you do it in a manner that percentagewise you go from Gavilan to Gavilan buffer in the same percent increase that you go from the buffer in Gavilan to the buffer in West Lindrith and that percent increase is the same from West Lindrith to unrestricted West Lindrith, rather than allowing going from Gavilan unrestricted to a fairly large jump, 180 percent, roughly, between unrestricted Gavilan and Gavilan buffer.

But that's really all we're asking is we -- I think I got lost.

MR. BROSTUEN: Thank you.

MR. LEMAY: I have a quick one.

QUESTIONS BY MR. LEMAY:

Q You addressed a possible, very early in your testimony, pressure sink. Do you have any information to go into that? Is there a pressure differential between the West Lindrith and the Gavilan fields, in the buffer zone, especially?

A Well, I mentioned that knowing more about the pressure in Gavilan than I do about the pressure in West Lindrith.

Dugan Production has just recently completed a well in West Lindrith, it's our Hurt No. 5 in Section 14 of 25, 3.

We've been involved with several wells that Hixon has drilled in Section -- or Township 25 North, Range 3 West, and based upon no actual pressure measurements but what I feel to be the pressure from what we observed the fluid levels to be during the completion process, I feel the pressure in West Lindrith is up in the range of 16/1700 pounds, and that's just a guess.

But what we see in the wells tells me it probably is in that range and I would expect this part of the West Lindrith Pool to be less affected by production in West Lindrith because it's out towards the edge of West Lindrith. It's more removed from the center of production.

Now, as you may be aware, part of the order that was issued for Gavilan required three measurements of pressure. One in June of this year, and at that time the pressure that was measured in the Gavilan-Mancos Pool ranged -- and the numbers I'm going to give you are at a subsea datum of a +370, or that's above sea level, it's +370 above sea level, which is the pressure datum that a lot of people are using in Gavilan.

The pressures that we measured ranged between right at 1100 pounds with the maximum being up in around 1250 pounds. I have the exact numbers that I could provide. They are on file with the Commission. But that was in June.

We are measuring pressure in that reservoir again today and based upon what I know about the reservoir, I would expect the pressure in Gavilan to be in the 900 to 1000 pound range now, which is more than 50 percent pressure depleted, and so knowing what I know about -- know plus anticipate in Gavilan, and knowing what I know about the recent completions we've been involved in with West Lindrith, I think the pressure is higher in the West Lindrith side than it is in Gavilan, and because of that, and that's basically what's behind the problem on the eastern edge of Gavilan, is we cause a pressure sink and Mr. Greer gets all upset because he's over there trying to keep the pressure

high, and fluid goes towards the point of lower pressure. To the fluid, that's downhill.

MR. LEMAY: Additional questions of the witness?

If not, he may be excused and we'll break for lunch returning at 2:00.

(Thereupon the noon recess was taken.)

MR. LEMAY: The meeting will come to order.

We'll resume -- Mr. Kellahin, are you completed with your witnesses?

MR. KELLAHIN: Yes, Mr. Chairman, thank you.

MR. LEMAY: Okay, Mr. Stovall?

MR. STOVALL: Call Mr. Al Kendrick.

A. R. KENDRICK,

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

DIRECT EXAMINATION

BY MR. STOVALL:

Q Mr. Kendrick, would you please state your name and place of residence?

A A. R. Kendrick, Aztec, New Mexico.

Q And what is your interest in this matter?

A I'm an employed consultant and represent --

Q By whom?

A -- Minel, Incorporated; T. H. McIlvain Oil & Gas Properties; Curtis J. Little Oil & Gas; New Mexico & Arizona Land Company; and Herbert Kai.

Q Are you familiar with the qustions before the Commission in Cases 9226 and 9227 and do you have knowledge upon which you're testifying?

A I think so.

Q Have you ever testified before the Commission and had your credentials accepted?

A Yes, sir.

MR. STOVALL: I'd offer the witness as an expert witness in this case.

MR. LEMAY: He is so qualified.

Q Mr. Kendrick, the first thing I would ask you to do, you have a copy of and you are familiar with the testimony presented by Mesa Grande Resources at a previous

session of this case --

A Yes, sir.

Q -- is that correct?

A Right.

Q I'd ask you to turn first to Mesa Grande's Exhibit Number B-2 and then to your exhibit which we'll identify as Exhibit Number One. For the information of those observing, it's the uncolored exhibit on the left side of the board up there; that's an enlargement.

Would you please tell the Commissioners what that is?

A The handout is a slightly corrected ownership plat for ownership of part of the acreage in the column of sections along the east side of Township 25 North, Range 3 West, that being Sections 1, 12, 13, 24, 25, and 36.

Q And what you've identified there is only the ownership as it varies from Mesa Grande's Exhibit Number B-2, is that correct?

A I think so.

Q Otherwise, to the best of your knowledge, the Mesa Grande exhibit with respect to ownership is substantially correct.

A The one part that is omitted in this exhibit is in the north half of the north half of Section 1 and the southwest of the northwest of Section 1. That tract

is owned by Minel, Incorporated. It's not shown on the handout.

Q But it is shown that way on the Mesa Grande exhibit?

A It shows that they have some wells in there. It shows the lease ownership being Gulf and they have Minel, Incorporated, wells.

Q And I'd next ask you to turn to Mesa Grande's Exhibit Number C-1, and you've heard the testimony presented by Mesa Grande and specifically Mr. Emmendorfer's testimony with respect to this exhibit, and you've also heard the testimony given this morning with respet to the geological boundary between Gavilan and West Lindrith, is that correct?

A Yes, sir.

Q Based upon your knowledge of the reservoir and upon Mesa Grande's Exhibit C-1, do you believe that West Lindrith and Gavilan-Mancos Pool are separate producing reservoirs?

A They're separate in the producing capacities of the wells because of reservoirs conditions.

Q Do you have an opinion as to whether or not the boundary established by the Commission for West Lindrith today as it abuts the previously established boundary for Gavilan is appropriate, supported by geological evi-

dence?

A Yes. I think it is reasonable. There is no way to have the surface boundaries to exactly follow the reservoir conditions for the separation of the producing characteristics of the reservoir.

Q The characteristics of the reservoir, are they sufficiently different to justify two separate pools?

A Yes, sir.

Q And do you agree with the statements that were made this morning that the administratively most appropriate location for that boundary is at the township line where it has been established?

A Yes.

Q I'd ask you now to turn to Mesa Grande's Exhibit C-2. You -- again you are familiar with this exhibit and you previously heard Mr. Emmendorfer's testimony with respect to that exhibit?

A Yes, sir.

Q I believe Mr. Emmendorfer testified to the effect that there is a correlation between the logs as found in the Mesa Grande Brown No. 1 Well and the Reading & Bates Greenlee Federal No. 41-24, is that correct?

A I think so.

Q What significance would you attach to that correlation (unclear)?

A These two wells are in very similar positions in the rservoir and would be expected to be as nearly alike as we would find in the reservoir.

Q Mr. Emmendorfer testified that the boundary was not clearly defined between the pools. He said it's sort of an area of transition, I believe, and there's been other testimony to that effect?

Are you saying that these are within that area of transition?

A I think that both of these wells are probably on the West Lindrith side of the transition but the administrative ease of handling the pool separation at the township lines should override the difference in the -- minor differences in these two pools.

Q Mr. Kendrick, based upon the testimony you've heard in this case, the exhibits you've looked at, and your independent knowledge of the reservoir characteristics in this area, do you have -- do you see or do you know of any reason why a buffer zone should be established, particularly with regard to production in West Lindrith?

A I see no reason for a buffer zone to be established. There is no evidence of drainage. The character of the wells do not differ sufficiently to encourage me to recommend the buffer zone.

Q I'd ask you turn to your exhibit, we'll

call it Exhibit Number Two, which would be the center exhibit on the board there. Would you identify those exhibits please, or that exhibit, excuse me?

A This exhibit has some colored-in portions of prorations in the Gavilan Pool that abut or nearly abut the pool boundary. The different colors do not reflect different ownerships, merely different proration units. This exhibit is designed to show that the proration units established by the Oil Conservation Division's case and Order R-7407-C created units in Sections 5 and 6 that's colored pink; and units in Sections 7 and 8 that's colored blue; the unit in Sections 17 and 18 colored in yellow; and unit down in Section 31 and the west half of 32 that's colored in darker green.

The unit in Section 19 that's colored purple and the unit in Section 30 that's colored pink are 187 acres, approximately, created by Order 8268 on the application of Jerome P. McHugh.

Adjacent to each of these nonstandard proration units there are 320-acre proration units that have been established by the development of the pool.

If a buffer zone is generated in this area, the administration of assigning allowables to this hodge-podge of proration units is going to be a problem that I don't think ought to be applied to the Commission staff.

Q Have you indicated on this exhibit a -- where that buffer zone would be in relation to those proration units?

A Yes. It's the cross checked area along the township line.

Q How many different types, and when I say "types" I'm referring to the sizes of proration units, would exist just within the Gavilan-Mancos Pool if the buffer zone were established as -- as proposed?

A I would identify them as the 505-acre drill tracts, of which there are four; the two 187-acre drill tracts; one 320-acre drill tract that is entirely in the buffer zone; and two 320-acre drill tracts that are halfway in the buffer zone.

Q When you say it would create an administrative burden for the Commission, do you have any knowledge or experience upon which you base that statement?

A Yes, sir, after 24-1/2 years I understand problems before the staff.

Q 24-1/2 years of --

A Of working in the Aztec office of the Oil Conservation Division.

Q And in that capacity were you directly concerned with allowables that had forced other allowables --

A Yes, sir.

Q -- determination of allowables?

Do you have -- I think we've heard testimony this morning that the restricted allowable in the Gavilan-Mancos Pool is the source of the concern among the Gavilan-Mancos owners who wish for a buffer zone.

Do you know why that restricted allowable was established?

A I'm not certain but I think that the restricted allowable was based on the Commission's feelings that waste was being generated and that the restriction was to attempt to prohibit waste or any further waste than would be necessary.

Q What sort of waste are they concerned with, do you think?

A Waste of reservoir energy by producing in excess of a most efficient rate.

Q Do any conditions exist within the West Lindrith Pool as it has been redefined by the order that was given to us this morning that would indicate that those same conditions exist in the West Lindrith Pool?

A No, sir, not to our knowledge.

Q Are you aware of any engineering or geological reasons why anything -- why rules and methods of production in the Gavilan-Mancos Pool should have any bear-

ing upon the manner in which the West Lindrith Pool is produced on allowables or producing rates?

A No, sir.

Q There was some discussion this morning regarding the setback for wells and some description of perhaps increasing the setback in the West Lindrith wells within this so-called buffer zone to, I believe, 790 feet from the existing rule 330 feet? Is that correct? Do you remember hearing that?

A Yes, sir, I heard something to that regard.

Q Is there any reason to the best of your knowledge that such a setback would be necessary?

A No, sir. In fact, I would recommend against that, based on the present development of the wells along the common pool boundary.

Q And why do you make that recommendation?

A The wells located in Sections 5, 8, and 17 are all at least 3200 feet from the township line. If we caused further setback on the west side of the line, this would cause these wells to be separated any -- even further back.

If a well were to drain a circular pattern so that it drained 640-acres square, that is the wells being drilled in the centers of 640-acre drill tracts, it

would have to drain 1005 acres to properly drain the reservoir, so that all the areas of the reservoir would be drained.

If we take the 3208 feet from the township line, which is the well in Section 5, and is the closest to that line, and apply it to drain to a 45-degree north and south to insure similar drainage on an even pattern, that well would have to drain 1484 acres to properly drain its share of the reservoir.

Q I'd ask you now to turn to what we'll call Exhibit Number Three, which is the exhibit which is on the right side of the board as we posted, and would you identify that for the Commission, please?

A This is a similar plat to the one shown on Exhibit Two.

The drill tracts colored in yellow are 160-acre drill tracts that have wells staked or drilled on them, which would be added to the Northeast Ojito Pool, which is a 160-acre spaced pool.

The two wells in 26 North, 2 West, or the, excuse me, the two spots colored green and blue identify two 640-acre proration units that were brought to hearing on November the 4th for forced pooling as possible wells in the Gavilan Pool.

In Township 25 North, Range 2 West, the

pink unit and the orange unit are two existing units that have been assigned to wells currently drilling and would be in the Gavilan-Mancos Pool.

Down to the south are three wells that were completed back in the first half of the year along in March, April, or May, that are spaced on 320-acre drill tracts. They're within a mile of the Gavilan Pool boundary but for some reason have not been brought within the pool boundary.

In the lower righthand corner there are two 40-acre drill tracts also within a mile of the Gavilan-Mancos Pool, which would cause them to fall under the existing pool rules of being within a mile. One of those is listed in the oil proration schedule as a wildcat well currently shut-in, and I was unable to find the other one listed in the schedule; however, completions have been reported on both of those wells.

Q And again is it correct that the proposed buffer zone is indicated by the cross marking there (unclear) point?

A Yes. The buffer zone is identified on that exhibit similarly to the others but these drill tracts show that there is no proposed continuity of the buffer zone to extend north or south to intercept places where this pools would abut in any manner.

Q Can you see any reasonable justification for establishing a buffer zone where it's proposed as indicated on your Exhibit Number Three?

A None whatsoever.

Q Now you've -- so far you've testified that you believe there is no basis for the creation of a buffer zone or any sort of special allowables within what we call the buffer zone. Do you have any opinion, were there to be a buffer zone established, as to which method would be preferable, be it Sun's proposal or Mesa Grande's proposal, as far as a buffer zone?

A I personally don't like either one of those. If a buffer zone needs to be applied, I think the entire buffer zone should be applied within the Gavilan Pool because this is the Gavilan Pool problem that's coming up, not a West Lindrith Pool problem.

Q And do I understand you to say that with respect to Case 9227, which concerns the Gavilan -- amendment to the Gavilan-Mancos Oil Pool, you wouldn't have any particular objection as a representative of people operating in West Lindrith, to any modification of the allowable or other such buffer zone rules within the Gavilan-Mancos Pool, is that correct?

A That is correct.

Q And is it your opinion that with respect

to Case 9226 regarding a buffer zone within the West Lindrith Pool, that there is no justification for that pool and that there should -- or for that buffer zone, and that there is no reason why the West Lindrith Pool rules should be affected by situations in Gavilan?

A I see no reason to apply a buffer zone in the West Lindrith Pool.

MR. STOVALL: I have no further questions.

MR. LEMAY: Thank you, Mr. Stovall.

Cross examination of the witness?

MR. PEARCE: No questions, Mr. Chairman.

MR. LOPEZ: No questions.

MR. LEMAY: Additional questions of the witness.

MR. BROSTUEN: I have a few, perhaps several questions.

QUESTIONS BY MR. BROSTUEN:

Q Referring to your Exhibit Three, I believe it is --

A Yes, sir.

Q -- you were mentioning that the two drilling and spacing units, 40-acre units in Section 24, Township 24 North, Range 2 West, those wells have been drilled -- are you saying those two locations have been drilled? Is that correct?

A Yes, sir, those have been drilled a number of years ago and were properly qualified as wildcat wells at the time they were drilled.

Q At that time.

A Yes, sir.

Q In the -- in Section 8 and 9, the same township and range, that are colored pink and purple, have those been drilled?

A Yes, sir, and those are -- all three of those wells in 6 and 8 and 9, are all carried in the oil proration schedule as Gavilan-Mancos Pool wells.

Q Thank you very much, that's all I have.

MR. KELLAHIN: Mr. Chairman, if I may?

MR. LEMAY: Mr. Kellahin, yes.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Kendrick, when we continue to look at Exhibit Number Three, am I correct in understanding that the

wells colored in Sections 6, 8, and 9 in 24, 2, were drilled as extensions to the Gavilan-Mancos Pool, I believe in answer to Mr. Brostuen's question?

A Yes, sir, and they were completed in March and April of 1987 before the new 640-acre pool rules were issued.

Q Do you know whether or not these wells are on the OCD Aztec office processing to be included in extensions of the Gavilan-Mancos Pool at the hearing on December 16th?

A No, sir.

Q Based upon your experience as an employee of the Oil Conservation Division over the years, Mr. Kendrick, what was the practice of the Oil Conservation Division with regards to expansions of pool boundaries? How did that occur when wells were drilled outside that boundary?

A If a well were within a mile or was thought to be in the same pool, the Commission staff assembled a case before the Commission and proposed the expansion of pools that encompassed those proration units that were developed outside the pool.

Q Based upon your experience, were you ever involved in situations where we had two separate pools of varying spacing units that were converging or growing together so that wells between those two pools were within a

mile of either pool rule?

A Yes, sir.

Q What was the Commission's practice in handling those type of wells in determining which wells to put those wells in?

A To study the reservoir characteristics of the individual well and to determine which pool that it properly belonged in.

Q You alluded to Mr. Emmendorfer's two-well cross section, I believe it was, that showed the Mesa Grande Brown Well and the Brown Lee Well which is in the West Lindrith, Brown well in Gavilan-Mancos, have you made any type of similar engineering study of the -- of either of those wells to determine which pool those wells ought to be in?

A No, sir.

Q Do you know whether or not there were any interference tests run between those two wells?

A No, sir.

Q Based upon your experience before the Division, Mr. Kendrick, are you aware of any situation where the Division has utilized different allowables within the boundaries of the same pool?

A No, sir.

Q Are you aware of any situation where the Division has utilized a gas allowable buffer proposal in es-

tablishing gas allowable rates between two pools that are contiguous?

A No, sir.

Q Have you made any type of engineering study or evaluation to determine where the producing characteristics between the Gavilan and West Lindrith alter in such a way that you could draw a boundary between the two pools based upon that engineering study?

A I made a cursory examination of Mr. Emmendorfer's exhibit and it's my interpretation of the structure map that where the contour lines change in density, where you have contour lines close together and they start widening apart, or where you have contour lines that have curves in them, you're generating complex curvature. This throws additional stresses into a contour reservoir and causes fracturing or crusting.

On this Exhibit C-1 presented by Mesa Grande, if one would look at Sections 4, 5, 8 and 9, in Township 25 North, Range 2 West, you'd find that the contour lines to the west are widely spaced and along the section corner of those four sections you'll find that abruptly those contour lines grow close together.

This means that the formation is being bent at that point and therefor conducive to fracturing.

If one would look along the township line

where their proposed buffer zone is, the contour lines are curved but they are at very uniform widths, are separated in very uniform positions and therefor there is curve in the formation but it is at the same slope so it appears to me to be a single flexing of the formation instead of a complex flexing or trying to bend it two ways, and therefor I can see that if this exhibit is reasonably correct, there will not be severe fracturing along that township line.

Q Other than a cursory examination of Mr. Emmendorfer's map, have you attempted to confirm that with any type of engineering study?

A No, sir.

MR. KELLAHIN: No further questions.

MR. LEMAY: Thank you, Mr. Kellahin.

MR. LOPEZ: Mr. Chairman, if I might follow up on Mr. Kellahin for a --

MR. LEMAY: Yes, Mr. Lopez.

CROSS EXAMINATION

BY MR. LOPEZ:

Q Mr. Kendrick, is it your opinion, therefor, just based on your last answer, that all the acreage in the buffer zone is more properly part of the West Lindrith

Pool rather than the Gavilan?

A No, sir, not necessarily. In Sections 8 and 17, for instance, there is a difference in the density of contour lines and the curvature, and in the northeast quarter of Section 5, or the north half of Section 5 and 6, there is curvature and a change in density of the -- of the contour lines, so I would anticipate more complex fracturing in the north half of Sections 5 and 6; more complex fracturing in the east half of 8; and in Section 17, all of 17; the north half of Section 20. As you go further to the east you find curvature and changing in density both, and I would anticipate a lot more severe fracturing to the east.

But to the west the formations seem to be -- or the contour lines seem to be at very uniform positions and therefor there would be lesser fracturing, in my opinion.

MR. LEMAY; Any more, Mr. Lopez?

QUESTIONS BY MR. LEMAY:

Q Mr. Kendrick, will you speculate with me just a minute? Assuming, is it fair to assume that we have one common source of supply within the fractured Mancos throughout the area?

A Yes, the supply is common but the produc-

ing characteristics of the wells vary widely in groups of wells. I'm not talking about a good well in a pool and a bad well in a pool. That occurs in every pool, there are some good wells and some bad wells, but here there would be groups of wells that would produce at substantially higher rates than other groups of wells that seem to be geographically grouped.

Q Is it fair to assume, or is it practical to say that you can segregate this common source of supply based on definitions of pools as we -- as we define them, or are we talking about gradational variations that -- that tend to defy limits that we'd set down to define pools?

A I wouldn't consider the variations here gradational. I think the gradation is very short but the change in producing characteristics of the wells is substantial over short lateral distance, to move from one group to another group. So I think it would be fair to separate those as a reasonable barrier or separation between the two pools for administrative purposes.

Q The big division is for administration, as I understand the testimony here today, and that would be -- is that your testimony, that the reason for division is more administrative purposes than characteristics of the reservoir, the two sides of the line?

A No, sir. The administrative purposes

would be along this common boundary to select a place for administrative purposes, but the producing characteristics of the wells do vary very widely but they do so pretty suddenly and in groups of wells and not just in occasional wells.

Q In looking at this area, and I emphasize area because you were stating down here that your history with the Commission has been that within a mile of production that -- that there's a well that is taken into that field, if it falls within a mile of production and produces from the same reservoir that there is production.

A Yes, sir.

Q But in this case is this unique enough because we have 640-acre spacing to keep this ratio, and I'm assuming 40-acre spacing would be an average step out from an oil pool, within a mile of 40-acre spacing. If we have 640-acre spacing do you think it's fair to say a well within four miles of 1640-acre spacing could be included in that pool?

A No, sir.

Q Why, with the ratio I just explained on 40 acres? Why would you take a different position on that?

A Too often the reservoir characteristics change as abruptly as they do here, they change within a mile, so that in a four mile spread you could be out of the

pool and into a separate pool and out again before you get four miles out, and as I experienced in such formations as in the Pictured Cliffs formations where we currently identify about 10 or 12 different pools, the pressure differential within a half mile would identify a well as belonging into one pool or another pool because of the pools having different pressures within those pools. But a four mile step may put you beyond the next pool.

Q Could a one mile step, then, if we're talking about 640-acre spacing with abrupt changes of reservoir characteristics, could -- could a mile, which would be a normal addition to a pool, would that be maybe even a wildcat in the sense that it could define different characteristics?

A That would be learned at the time a well is drilled, but it's possible that it would happen, and these wells on the south part of my Exhibit Three might still well be classified as wildcat wells, but the pool rules says that any well within a mile of the pool shall be treated as a pool well.

Q That's -- that's the concept I was -- I asked you to speculate with me on, that concept with your testimony that these pools as you see them and as we attempt to define them, is an after the fact analysis, which in itself would probably defy the administrative orders that we

tend to come up with because that tends to be an operational analysis, and then it seems like we try and redefine that operational analysis in terms of characteristics of the reservoir kind of after the fact, and I'm wondering which -- what we're really doing in here, looking at an operational analysis between fields, a different philosophy in development, and then trying to get the size to fit in somehow, or whether we are really looking at characteristics of the reservoir where we can define fields after the fact based on some of the fracturing or some of the deliverability of the wells.

A It is entirely possible, and I will admit that it has happened, that wells were placed in the wrong pool because of a lack of proper information, and over the years some of the pools have been reduced in size and the wells transferred to other pools after sufficient information was developed to show that the wells had been improperly placed within those pools.

Q But where we have a situation, again let's speculate here, you're coming down here where you're not defined by either Gavilan or the West Lindrith, you decide to drill a well. Would you allocate 40 acres to that well, 160, or 320, or would you drill the well, try and decide on what characteristics it had, and then try and get together your proration unit based on those characteristics?

A The experience that I've had was that the majority, the vast majority of wells drilled within a mile of a pool would properly belong in that pool if they're completed in the same formation.

The exceptions are a very small percentage of those wells, especially in the San Juan Basin.

Q But in this pool we're talking about fractured Mancos. We're really talking about fractured Mancos throughout the area, so if you're drilling a well close to two fractured Mancos reservoirs and you have the option of 640, 160, or 40, do you make a practical decision to allocate 40, 160, 640 to that well prior to drilling or what, what do you do in a case like that?

A Well, I think that the operator should apply his best knowledge and proceed in that direction and discuss it with the Division staff as to why he is applying to drill a well and dedicate it to a particular pool where the three options are available, and not -- not necessarily be nailed down to the fact that because it's within one mile of one pool it couldn't also be within a mile of another pool, and therefor he should have the option to go either way, based on his best information.

If his information is wrong, then move the well to the other pool.

Q And then another operator comes in before

we spaced the area and offsets with a different interpretation of the area, we'll say he thinks maybe 40 acres might be the appropriate spacing and maybe that's all the acreage he can get together, and drills a well. So you have 40 acres offsetting 160, or offsetting 320 or 640.

I guess my -- my question, ultimate question is, would it be helpful to the industry if we spaced the east side of the San Juan Basin Mancos according to a formula that could be determined prior to drilling?

A I don't think so because the possibility of having to go back and redo the same amount of work by assigning a different acreage and developing other pools would still have to happen, so --

Q Well, I wasn't thinking in terms of redoing what's already been done, but in terms of addressing those proration units that have not been drilled so an operator would have an idea prior to drilling a well what would be a minimum spacing example, maybe a minimum 160-acre spacing, or something on areas on the east side of the San Juan Basin where, one, Mancos production was anticipated, fractured Mancos, and two, there -- there's a number of spacing units that could apply to that particular location in the undrilled portion of this tract.

A I think it ought to be on an individual well basis and apply the best information we have at that

time and not establish a policy for the half of the Basin.

Q Thank you. That's all the questions I have.

MR. STOVALL: Mr. Chairman, I still have one technical matter I'd like to take care of; oversight on my part.

REDIRECT EXAMINATION

BY MR. STOVALL:

Q Mr. Kendrick, were Exhibits One, Two, and Three prepared by you and are you knowledgeable of their accuracy?

A They were prepared by me and I think they're correct.

MR. STOVALL: I'd like to offer Exhibits One, Two, and Three into evidence.

MR. LEMAY: The exhibits will be admitted without objection.

Additional questions of the witness?

If not, he may be excused.

Are there -- any additional witnesses, Mr. Stovall?

MR. STOVALL: I do not.

MR. LEMAY: Anyone else wish to

present any testimony in this case?

Yes, Mr. Pearce.

BILL HAWKINS,

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

DIRECT EXAMINATION

BY MR. LUND:

Q Will you please state your name and business address?

A Bill Hawkins. I work for Amoco Production Company in Denver, Colorado.

Q In what capacity are you employed?

A I'm a Senior Petroleum Engineering Associate, currently assigned to proration and unitization duties throughout our Denver Region.

Q And you've never testified as an expert before this Commission, have you?

A No, I have not.

Q All right, would you please quickly state your educational background from college on and work experience and (unclear)?

A I graduated from Texas Tech University in 1972 with a BS in petroleum engineering; graduated with a

Master of Engineering in 1974 and started work with Amoco Production Company.

I worked as a petroleum engineer, doing both reservoir engineering and production operations in our New Orleans Region from 1974 through 1983. For the last three years of that period I was the Division Reservoiring Supervisor for at one time the Offshore Division and at another time for the Onshore Division.

I was transferred to London and I was the Regional Engineering Supervisor for our Amoco Europe and West Africa Region, handling fields in the North Africa Offshore, and also, excuse me, West Africa and the North Sea off of the UK and the Netherlands.

I've been in Denver since 1985, for one year as the Division Operations Engineering Supervisor for the Northern Division, and for the last year and a half in my present capacity as a Proration and Unitization Engineer.

Q Is the area that we'beeen talking about today as part of these two dockets within the area of your responsibility?

A Yes, it is.

Q Have you prepared an exhibit to help with your testimony?

A Yes, I have.

MR. LUND: We would offer Mr.

Hawkins as an expert at this time.

MR. LEMAY Mr. Hawkins qualifi cations are acceptable. Please continue.

Q Would you please turn to Exhibit Number One, identify it, and explain its significance?

A Exhibit Number One is a plat of the West Lindrith - Northeast Ojito area. Northeast Ojito is shown in the upper righthand corner, Sections 25, 26, 35 and 36, of Range 3 West, Township 26 North.

Within the Northeast Ojito Pool we show with a dashed line the 790-foot setback requirements in the pool rules.

Immediately to the south of the Northeast Ojito area is the expanded West Lindrith area and we show with the solid line what the current West Lindrith setbacks are of 330 feet from the pool boundaries.

The dashed/dotted line that we show within the West Lindrith expanded area is Amoco's recommended buffer setback of 790 feet, such that it would be equivalent to the 790 setback immediately north of the boundary of West Lindrith.

We would, in fact, support a 790-foot setback along the Gavilan - West Lindrith border. It's not shown on this map, or we didn't show the 790 feet, but we would support it for the same reasons that it would be equi-

valent setbacks on both sides of the adjoining pools.

In addition, we show on the -- on the upper lefthand portion of the map some sections that would come within one mile of pools that have established pool rules and setbacks and we would propose that, for instance, in Section 34, the buffer or setback -- excuse me, not buffer but the setback requirements should be 330 feet where it is adjacent to a 330-foot setback in West Lindrith, but it should be 790 feet where it is adjacent to the Northeast Ojito Pool that has a 790-foot setback.

So this exhibit is designed to express Amoco's desire to keep an equivalent setback on either side of the pool boundary for Northest Ojito and we would support that same position for West Lindrith and Gavilan.

Q Why do you think that that's fair?

A Well, it at least keeps a well at the same distance from the boundary, such that if the wells were able to produce under identical pressures and rock and fluid characteristics, the (unclear) boundary between the two wells would be on the boundary line and it would eliminate any potential for correlative rights violation.

Q What about existing wells in that area?

A We would propose that any well that is currently drilled be grandfathered in as an exception to this setback.

Q Okay. Was Exhibit One prepared by you or under your supervision and control?

A Yes, it was.

MR. LUND: We'd offer that into evidence, Mr. Chairman.

MR. LEMAY: Without objection Exhibit One will be admitted in evidence.

MR. LUND: Very quickly we've gone past the setback requirements. We agree with Mr. Roe and obviously disagree with Mr. Kendrick and we'd like to talk real quickly about the buffer.

MR. LEMAY: That will be fine.

Q Mr. Hawkins, just in general, what is your opinion about the discussions you've heard today about the buffer, particularly about its impact on the West Lindrith?

A We've listened to all the testimony today concerning the need for buffer allowables and there's been quite a bit of testimony that the Dakota production is non-quantifiable. Some people believe it to be relatively insignificant. Amoco believes it to be significant in some areas and since this is a sparsely developed area along West Lindrith's border, it could be significant in those undeveloped tracts.

We have done some selective testing on

the Amoco Production No. 15 Well up in Section 25 that indicates the Dakota can produce up to a million cubic feet a day.

There's also been some testing on the --

MR. LEMAY: I'm sorry, that was the 15 Amoco?

A Yeah, it's up in Section 25, Range 3 West, Township 26 North, in the Northeast Ojito Pool. That well is located approximately a mile from the West Lindrith border and we feel like that is close enough that you may find significant Dakota production within the undeveloped areas of that West Lindrith Pool.

MR. LEMAY: Would you identify that well again?

A It is the well that's shown in Section 25. It's in the southeast southeast portion of Section 25. It's identified as Jicarilla Apache 15 Amoco Production Company.

In addition to that we have looked at some selective tests that were done on the Amoco Well No. 8 in Section 35 of Northeast Ojito. The Dakota zone in that well produced with a gas/oil ratio of 9500 cubic feet per barrel, whereas the Mancos, or Gallup zone, produced with a gas/oil ratio of 1151, so it does indicate that although the volume may be relatively small, the impact on the GOR that a

commingled well would have could be significant; that the Dakota does contribute in this area and it, although it may bae variable througout an individual well, it appears that within one mile of a very good Dakota production well, you know, you'll maybe have some wells that aren't quite as good but there may be another good Dakota contribution well within another mile of that.

Because the Dakota is a -- can be a signficant contributor, we don't feel that any restriction on West Lindrith allowables would be appropriate, because you would be restricting the Dakota production as well as the Gallup production.

In addition to that, we don't believe that there is any need to restrict the West Lindrith production in any event. We've heard testimony today that there is a significant pressure differential between the Gavilan Pool and the West Lindrith Pool, which would indicate that reserves or fluids would probably migrate, or is probably migrating towards the Gavilan Pool.

To cause any further restriction on West Lindrith would certainly seem inequitable to us and therefore we would not recommend that there be any restriction placed on the West Lindrith allowables.

Q There've been a couple questions about how a ruling by the Commission might impact on future dril-

ling plans. What is your opinion about that factor?

A I think if we -- if the Commission were to restrict allowables on the West Lindrith Pool along the buffer area that any -- any drilling prospects that were evaluated by Amoco or any other company would certainly have to take that restridted allowable into account; would have to re-evaluate the economics for investing in that area, and compare that to their other opportunities that they might have for -- with the limited funds that we're operating under, at least today and today's economic environment, and I would say that it would certainly impact the relative position or relative priority of these prospects as opposed to other prospects that may exist for a company to invest.

Q So if a buffer were to be imposed by the Commission, what would your recommendation be?

A Well, Amoco certainly feels that there is no reason to restrict the allowable production out of the West Lindrith Field. We believe that if a buffer were to be designated here and some tiered allowables put in , that it should be in the Gavilan portion of the field or in the Gavilan Field along the western edge.

MR. LUND: Nothing further and we tender Mr. Hawkins for cross examination.

MR. LEMAY: Thank you, Mr. Lund.

CROSS EXAMINATION

BY MR. LOPEZ:

Q Mr. Hawkins, I think you just stated that you relied on testimony for (unclear) questions. On -- on what evidence do you base your opinion that there is a pressure differential between the Gavilan-Mancos and the West Lindrith across the buffer zone we've been discussing here today?

A I have not performed an engineering study although I have seen pressure data that has been published for the Gavilan area and I am basing my opinion that if the testimony we've heard today is correct, that there is a pressure differential of approximately 500 pounds is what I think was stated. 1500 to 1000, that there would certainly be migration of fluids towards the Gavilan area.

Q On -- on what basis was the evidence that you were relying, that there's going to be this pressure differential, on what was it based, do you know?

A It seems to me that he based it on some fluid levels in the West Lindrith area.

Q You don't know what part of the West Lindrith area?

A Said in wells that hey had drilled.

Q You stated that you believed that the

setback requirementas you recommended would solve any correlative rights problems between the two pools, the Gavilan Pool and the West Lindrith Pool.

A Yes.

MR. LUND: Objection. I think that is characterizing his testimony.

MR. LEMAY: Well, I think Mr. Lopez can rephrase the question.

MR. LOPEZ: Well, I think the witness has answered it.

A Well, I agree that wells that can produce under the same flow characteristics, the same rock properties and rluid properties that are located equidistant from a well would not have any particular correlative right damage.

Q Isn't it in fact the case that we have twice the number of wells being able to be drilled in the West Lindrith area than we do in the Gavilan area and that the Gavilan area is suffering from production rate restriction?

A I understand there is a production rate restriction under the Gavilan area. I don't necessarily believe that there are any wells today that are causing any kind of a correlative right problem. I also believe there's opportunity for operators to drill additional wells without

increasing rate if they so desire to protect their correlative rights.

Q Doesn't that -- isn't that partly dependent on the economics of the situation as to whether a well could be drilled under restricted allowables?

A Sure.

Q Do you see any correlative rights problems where there is a restriction on one side of a boundary line, assuming there's no geological difference across the buffer zone and one side of the boundary suffers restricted allowables and restricted spacing?

A I think the correlative right problem would exist when the wells are drilled, if they can -- cannot achieve their allowable there's an opportunity to drill another well to try to increase that. Until that point the allowable really is not causing a restriction or anyl potential loss of correlative rights.

Q And if I understand you correctly, you would agree with Mr. Roe that Amoco would prefer that the rules of the game be developed on a case-by-case basis rather than on the basis with some wells being drilled and being severely curtailed and in fact right across the buffer zone in the West Lindrith they are excellent wells, rather than knowing the rules of the game going into it?

A No, I wouldn't say that at all. I think

Amoco's position is that there is no need to have a buffer or restricted allowable in West Lindrith, and that if there is a need for a buffer in any -- for any reason, it should simply be on the west Gavilan side of the boundary.

MR. LOPEZ: No further questions.

MR. LEMAY: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Hawkins, were you involved in representing your company when the Division created the Northeast Ojito Pool?

A No, sir, I was not but I have reviewed the records on that.

Q Do you recall in reviewing the records that at that time, using your Exhibit One as a display, that Sections 1 and 2 were at that time in the Ojito Gallup-Dakota Pool spaced on 40 acres?

A That's correct.

Q And Amoco created the northeast Ojito using Sections 25, 26, 35 and 36?

A That's correct.

Q And at the time that pool was created Amoco had drilled some wells along the southern tier of Sec-

tion 35 and 36? Some of those wells were there?

A That's correct.

Q Do you recall that the application of Amoco was a request to space those four sections on 160 acres?

A Yes.

Q And that those sections would abut up and be contiguous with a 40-acre spaced pool in Sections 1 and 2?

A That's correct.

Q And in order to obtain the spacing, did not that order also require that the Amoco wells, although spaced on 160 acres, would have a restricted 40-acre allowable for those wells?

A Those southern tier wells, that's correct.

Q And what was the reason that was done, Mr. Hawkins?

A As I recall that was done as a compromise between companies in order to correct -- or not correct, but reduce or eliminate any potential correlative rights.

Q It was to avoid the potential that the high capacity Amoco wells with greater gas allowables would be allowed to drain portion of spacing units on 40 acres in Sections 1 and 2.

MR. LUND: Objection; I think that's --

Q Was that not true?

MR. LUND: I object to the form of the question. It mischaracterisd the --

MR. LEMAY: I think you can re-phrase the question, I think, Mr. Kellahin.

Q In reviewing the records, did you examine any geologic information that was presented at that hearing?

A I believe our testimony at that time indicated that the producing characteristics in the Northeast Ojito indicated that there was the presence of fracturing, whereby our wells could drain 160 acres, and that would be the appropriate spacing.

Q The spacing and the rules were established because of the location of the wellbores in proximity to fractures and therefor the prpducing capacities of the wells was the basis for setting the allowable restriction as opposed to a geological reason?

MR. LUND: Objection. I think that that mischaracterizes what happened also.

A I think what we're saying is that the presence of fracturing there, or the producing characteristics indicated the presence of fracturing and that that was a different producing mechanism than what was

deemed to be present in Ojito and it was also probably a different geological regime that caused that producing characteristic.

Q The geologic cross sections that ran from the Northeast Ojito down to the Ojito at that time did not show any significant geologic feature that would have geologically separated the Northeast Ojito from the Ojito, is that not correct?

A I believe that's right.

MR. KELLAHIN: No further questions.

MR. LEMAY: Additional questions of the witness?

If not, the witness may be excused.

One quick one there.

QUESTIONS BY MR. LEMAY:

Q In that discussion back and forth between Mr. Kellahin and you, a restricted allowable in the south tier of wells there in 35 and 36, Mr. Hawkins, could that be considered a buffer zone because of restricted allowable, or not?

A I think we could consider that an internal buffer zone along Northeast Ojito, and as you're aware,

we have submitted an application to lift that restriction because we feel that the expansion of West Lindrith is going to provide for 160-acre allowable and spacing immediately adjacent to us and so therefor that -- there should be no internal buffer within Northeast Ojito any more.

Q The reason being, though, you're lifting it is because you have 160's versus 160's rather than 160 versus 40?

A That's correct.

Q Thank you.

MR. LEMAY: Additional questions?

MR. KELLAHIN: May I follow up with a question in response to what you asked?

MR. LEMAY: Fine. Go ahead, Mr. Kellahin.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q Have you examined any of the wells, Mr. Hawkins, in Sections 1 and 2 to determine whether they demonstrate a producing capacity that would allow them to produce the top 160-acre gas allowable?

A I have not examined those two, the NZ and the NZ-2 Well, which are very close to our Northeast Ojito

in great detail. I have seen that the NZ-2 Well is a good well. I'm not sure what kind of top rate that well is capable of producing at.

MR. KELLAHIN; Mr. Chairman, I think it might be useful to consideration of the current case if you took administrative notice of and reviewed Case 8822, which is the situation by which the Division created the Northeast Ojito Pool. We would contend that it's very much like what's going on between West Lindrith and Gavilan Pools.

MR. LUND: Mr. Chairman, I have to make one point about the prior case. Amoco in no way retreated on its geologic interpretation in its request for 160 spacing in that case and by virtue of a compromise on the disputed issue we reached an agreement on how we were going to be proceeding and we in no way retreat from our technical basis, as Mr. Hawkins stated, and that should be clear in the record and I believe the official record in the file will demonstrate it.

MR. LEMAY: Fine, we'll take note of that, Mr. Lund.

MR. LUND: Thank you.

THE REPORTER: Mr. Lund, did you ask that your Exhibit One be admitted?

MR. LUND: I think I did but if

I didn't --

MR. LEMAY: Without -- if I didn't, without objection Exhibit One will be admitted.

MR. LUND: Thank you.

MR. LEMAY: Additional questions?

If not, the witnes may be excused.

MR. LEMAY: Are there any additional witnesses in this case, testimony?

Any statements that anyone would like to read in the record at this time before closing arguments?

MR. LOPEZ: Well, I have a couple of rebuttal witnesses.

MR. LEMAY: Fine. I didn't know you -- go ahead.

We can -- let's take a ten minute recess.

(Thereupon a recess was taken.)

MR. LEMAY: The meeting will come to order.

Mr. Lopez, you may proceed.

MR. LOPEZ: Our first witness has two exhibits.

KATHLEEN MICHAEL,

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

DIRECT EXAMINATION

BY MR. LOPEZ:

Q Would you please state your name and where you reside?

A My name is Kathleen Michael and I reside in Tulsa, Oklahoma.

Q Did you testify in the first day of hearing in this case?

A Yes, I did.

Q And were your qualifications as an expert land person accepted as a matter of record?

A Yes.

Q I'd ask you if --

MR. LOPEZ: Is the witness qualified?

MR. LEMAY: I'd ask you if we swore in your two witnesses. Did we do that?

MR. LOPEZ: Well, I think

they're still under oath.

MR. LEMAY: Are they still under oath? Okay, we'll take note that they're still under oath from the last time they testified.

You may proceed.

MR. LOPEZ: I'd call to the Commission's attention we handed out a booklet last time that had exhibits listed A through E in different numberings depending on how many fell under that division.

We've taken or labeled all our exhibits we plan to introduce here today in rebuttal as Exhibits F-1 through F-6, I think.

Q I now would ask you to refer to what's been marked as Exhibit F-1 and ask you to identify it.

A Exhibit F-1 is a revised land plat and for the most part the revisions fall in placement of certain aspects. We've removed the wells to make the land part of it a little clearer.

Also in yellow is highlighted the acreage of Mesa Grande Resources, which falls within the proposed buffer zone and highlighted in blue is the acreage of Sun and Dugan, which falls within the proposed buffer zone.

Q Okay. I'd now ask you to refer to what's been marked as Exhibit F-2 and ask you to identify it.

A Exhibit F-2 is the same land plat which

shows again in yellow the acreage of Mesa Grande not only in the buffer zone but in all of the acreage on the plat and all the lands covered on the plat, and by the same token, the acreage Sun, not only within the proposed buffer zone but within the entire area covered by all the lands covered by the plat.

Q Okay. Were Exhibits F-1 and F-2 prepared by you or under your supervision?

A Yes, they were.

MR. LOPEZ: I would move the introduction of Mesa Grande's Exhibits F-1 and F-2.

MR. LEMAY: Without objection the exhibits will be admitted into evidence.

Q Does that conclude your testimony?

A It does.

MR. LEMAY: Are there any questions of the witness?

If not, the witness may be excused. Thank you.

MR. LOPEZ: I'd like to call Mr. Emmendorfer.

ALAN P. EMMENDORFER,

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

DIRECT EXAMINATION

BY MR. LOPEZ:

Q Will you please state your name and where you reside?

A I'm Alan P. Emmendorfer and I live in Broken Arrow, Oklahoma.

Q Do you understand that you remain under oath?

A Yes.

Q You did testify in the first hearing in these cases and had your qualifications as a geologist accepted as a matter of record?

A Yes, I did.

MR. LOPEZ: Is Mr. Emmendorfer considered qualified?

MR. LEMAY: His qualifications are accepted.

Q The -- I'd refer you now to what's been marked Exhibit F-3 and ask you to explain that exhibit.

A Mr. Chairman, F -- Exhibit F-3 is a little explanation as to the following next two exhibits, to show how I arrived at some calculations -- some numbers through a calculation process.

If we take a well, and assuming it's pro-

ration unit being a 40-acre, 160-acre, 320, or whatever, and we reduce that to a 160-acre drainage radius, or 160-acre proration unit well and the way it is a 320 well, also, if that drainage radius extends into the next section line or into the next proration unit, a portion of that drainage radius is without the proration unit that it was assigned to, and compensatory drainage is understood that one well on one side of a proration unit may overlap into the next proration unit and that -- that well's drainage radius may overlap into the other, but hopefully, they will be fairly close in their drainage.

What I've shown here is a way of calculating the acreage within that drainage radius that actually overlaps into an adjoining proration unit. It is a -- I hate to use the word simple mathematical calculation -- deriving probably was not simple but following it is -- is fairly simple when you're using the calculator. That portion of the drainage radius that crosses that proration unit defines a segment of a circle and the area of that segment can be calculated using the formula that I have listed down here.

It's strictly to tell us how many acres of a drainage radius assigned to that well occurs outside of its proration unit.

Q And did you use this formula in

calculating the segments in -- under various scenarios and in this connection I refer you to Exhibits F-4A and F-4B?

A Yes, I did. Before I get into exactly what these exhibits show, I'd like to refer you back to Mesa Grande's exhibits from last month; particularly to B-3.

We've heard that there are a lot of different proration units that are affected within the buffer zone area. The West Lindrith is on 160 and, as we can see in Exhibit B-3, we have 505's, 320's, and 187-acre drainage radiuses set up by the different proration units that are in existence within the Gavilan-Mancos portion of that buffer zone.

So, what I did was I applied the drainage radius calculation for drainage overlap to several different scenarios.

If we look at F-4A, I took first the West Lindrith Pool, the 160-acre drainage radius with the current setback of 330 feet from the line and it calculates out that 41 acres of that 160-acre drainage radius occurs within the Gavilan-Mancos portion of the buffer zone.

If I take the West Lindrith Pool at 160-acre draiange radius and set it back at a 790 setback, this reduces the overlap to 33 acres projecting into the Gavilan-Mancos Pool.

Within the Gavilan-Mancos we have 640-

acre spacing on any new wells that are drilled in the area; however, in the buffer zone it's already been established that we're going to have two additional type of wells drilled; either 187-acre proration unit, which has already been drilled in Section 30, the Sun Full Sail No. 4, and there's an open space in Section 19. Both of these are in 25 North, 2 West.

With the 790 setback the Gavilan-Mancos lives by, that drainage overlap is 41 acres.

Sections 5, 6, 8, 7, 17, 18, and 31, 32 are 505-acre proration units. We're allowed to drill a second well on that proration unit and divide the production. That would account for a 252-acre drainage area for a second well drilled within that proration unit.

With the 790 setback, the overlap of drainage is 57 acres.

Now if I can refer you to Exhibit F-4B, Mr. Chairman, this is a graphical presentation of this same tabular data on the drainage overlap. I won't go into it in too much detail but the hypothetical well in Section 7, 25 North, 2 West, would be a 252-acre drainage radius. I already noted that it's drainage overlap into the West Lindrith would be 57 acres.

Section 19, that well would be on 187-

acre proration unit. It's drainage overlap is 41 acres into the West Lindrith.

Down in Section 25 of 25 North, 3 West, we have a hypothetical well within the West Lindrith, setback 230 feet from the line and it shows that its drainage radius extends into the Gavilan-Mancos Field by 41 acres.

And then in Section 13 I've shown two 160-acre drainage radiuses setback 790 from the line and, as I noted earlier, that scenario gives 33 acres of drainage overlap into the Gavilan-Mancos.

At first look one could say, well, gee, the Gavilan-Mancos is enjoying something over the West Lindrith because they have 57 acres overlap into the West Lindrith and a 41 acre one, depending on if it's a 252-acre drainage radius or 178 -- 187-acre drainage radius; however, we would only be allowed to drill one well. In Section 13 they're allowed to drill two wells in the eastern half within the buffer zone of the West Lindrith and each of those only has a 33-acre overlap, but combining those two, that's 66-acre overlap into the Gavilan-Mancos; 66 acres versus 57 acres or 66 acres versus 41 acres; however, if there was no buffer zone rules and we were at 330-acre setback, which is the case as it stands now, West Lindrith would have two wells at 41 acres each or 84 -- 82 acres versus 57 or 41 within the Gavilan-Mancos.

And I might just add one more point that -- I think I mentioned it before but I want to point out again that the way this development is to date, we're only allowed to drill one -- one extra well within that 505 or within that 187, so there is going to be two wells versus one across the lines.

Q I now refer you to what's been marked Exhibit F-5 and ask you to identify and explain this.

A Exhibit F-5 is a structure and production map of an expanded area east and west of the buffer zone area. I used the same structural datum mapping that I did in my previous structure map of a month ago, only enlarged the scale of the sections and I also included production data for these wells.

The structure is based again on the top of the Niobrara A zone and it shows the structural configuration within the area, and as I've testified earlier, I don't -- do not see a strict geological boundary between the two pools, Gavilan-Mancos and the West Lindrith from this structure map.

I have included on each of the wells that we have production data some producion figures. The first number would be the initial potential, the initial potential as reported to the State, and then the numbers below that would be the cumulative oil and the cumulative gas produced

from these wells up to 10-1-87.

Q Would you like to point out what has occurred with any individual wells shown on this map and indicate where they're located?

A Yes. Mr. Chairman, the Gavilan-Mancos produces only from the Mancos formation and the West Lindrith Gallup-Dakota is allowed to produce commingled Gallup and Dakota; however, that is not the case in all wells. I would like to point out the ARCO Gardner Federal 13-1 in the southwest of Section 13, 25 North, 3 West. Mr. Roe talked about this a little earlier today. I've listed both the Gallup and the Dakota IP's. The G would be the Gallup and D the Dakota, and also their production.

If we look now at the Dakota production we see the well produced 860 barrels of oil, 2337 MCF of gas strictly from the Dakota. The Dakota zone was plugged in May of '87; recompleted only in the Gallup or Mancos interval and has produced to date over 4000 barrels of oil and 24,509 MCF.

Okay, likewise, we can look in the southeast of Section 23 of 25 North, 3 West, ARCO's ARCO Hill 23-2, and it's in the southeast of Section 23, the same case existed as with ARCO's Gardner Federal Well where the Dakota produced about 600 barrels of oil. The Dakota zone was plugged in May of '87. The well was subsequently recompleted

within the Gallup or Mancos interval only. It is currently producing from the Mancos interval.

We also heard a little bit of testimony about a well in Section 1 where the Dakota has been plugged off. I just heard about that yesterday myself and I'm sorry I haven't had time to verify that or to find out exactly which well that is, but one of the wells in Section 1 is producing only from the Mancos portion of the West Lindrith Gavilan -- or Gallup-Dakota Field.

So in effect there are some of these West Lindrith wells, one of them -- one proration unit offset of the proposed buffer zone that is producing strictly out of the Mancos interval.

I would also like to point out some of the productive capabilities of some of the West Lindrith Gallup-Dakota wells.

In particular, some of the latest wells that have been drilled, Hixon has been very successful in developing the West Lindrith Field. I don't know if -- how they can attribute all their production, if it's placing your wells in the proper area or completing them properly, or both, or what, but the Bill Geiger No. 1 in the northwest of Section 34, 25 North, 3 West, had an IP of 612 barrels of oil per day and 657 MCF of gas per day. If that well was allowed and it could produce what its IP is, it would be al-

lowable restricted based on the West Lindrith Gallup-Dakota statewide rules.

Likewise, in the northwest of Section 35, 25 North, 3 West, Hixon (unclear) No. 1-5 had an IP of 5 -- 520 barrels of oil and 460 MCF of gas. Again that productive capacity is greater than the allowable, the statewide allowable for the West Lindrith Field.

There are several other wells that we could look at that have those high productive wells.

ARCO has one, I'll just briefly mention the location. It is in the southwest of Section 27, 25 North, 3 West, 420 barrels of oil per day.

The other thing that I would like to point out from the production map is offsetting wells, their productive capability, and this has been alluded to by both yourself and other people that have testified today, that you can have a very high productive well right adjacent to the next proration unit, the well does not produce significant quantities to be commercial or to pay out a well or marginally be commercial.

Completion practices and/or location of the wells have a lot to do with this. I just again wanted to point out that certain wells are excellent producers offset by poor wells.

Q Did you hear Mr. Humphries statement to-

day that -- or at least his suggestion that maybe the industry was inviting too much regulation and that perhaps Mesa Grande motivation here was to benefit itself along the buffer zone where no one else was benefitted?

A Yes, I did hear that.

Q I would like to refer you to Sun's exhibit 30, on page 30 --

A Yes.

Q -- and 31, and ask you to explain, if you will, whether or not you think this accurately reflects the effect that Mesa Grande's proposal here for the buffer zone allowables is clearly understood, and in this connection I would also advise the Commission to also refer back to our Exhibit B-3 that we've been referring to so you'll notice where these wells are situated on the map.

A Mr. Chairman, the way I understand Sun's exhibit, they were based on allowables based on a 640-acre proration unit in the Gavilan-Mancos, which is all well and good for any wells that are based on 640 acres.

If you'll look back at Exhibit B-3 you'll notice that Sun's Loddy Well in Section 20, Sun's Full Sail No. 3 in Section 29, both of 25 North, 2 West, are in fact 320-acre proration units, so when we look at their pages 30 and 31 in exhibit -- Sun's Exhibit Number One, we have to adjust their proposed gas allowable line and their proposed

oil allowable line. As stated, they base this on a 640-acre proration unit. These are 320-acre proration units. What we would have to do is divide that gas allowable by -- by half. In so doing, if we moved that proposed gas allowable line down to approximately 7000 MCF per month, it's noted, then, that the Loddy Well would be allowable restricted in that its productive capabilities would not be realized because of Gavilan-Mancos rules.

Q I'd now refer you to the Full Sail Well and ask you if you would do the same exercise based on that.

A Yes. In the Full Sail No. 3 Well on page 31, the example is exactly the same. That is a 320-acre drainage or proration unit and again we would have to divide both the proposed oil allowable and the proposed gas allowable by 2 and that again would be approximately 7000 MCF per month, and if we dropped that proposed gas allowable line down to where it should be, we would also note that the Full Sail No. 3 Well would be allowable restricted.

So to answer your question, Owen, Mesa Grande is not the only one that would be affected by our proposal. The Full Sail 3 and the Loddy No. 1 of Sun's would also be affected considerably.

Q All right. If I understood your testimony, along the Gavilan-Mancos West Lindrith border line within the Gavilan-Mancos Pool, there don't exist any 640-

acre proration units, do there?

A No, no, there is not, and that's why -- that way when you look at Sun's exhibits, you have to take that into account, that 640 acres does not realistically apply to the Gavilan-Mancos side of the buffer zone.

Q I -- you -- did you hear Mr. Brostuen's line of questioning this morning with respect to the effect of not coming up with a solution might have on additional drilling by industry, and in this connection can you explain some of the problems Mesa Grande foresees if some solution isn't adopted with respect to its drilling program along -- on its acreage along the buffer zone?

A Yes. Mesa Grande has some undeveloped acreage along the buffer zone, specifically in Section 19, 25 North, 2 West, and which is a portion of a 187-acre proration unit, and then the Brown Well and the Marauder Well are part of 505-acre proration units and at the operator's discretion could drill a second well and divide that production, having 252-acre allowables.

Well, in section -- in the 505-acre proration unit which the Brown Well is in, that well is allowable restricted in its production.

The West Lindrith people could drill, and will probably drill sometime in the future, two wells in the east half of Section 13. Without a buffer zone they could

put it at 303 -- the 330 acres -- excuse me, 330 feet from the boundary and what we have proposed is 720 -- 290 feet from the boundary.

Mesa Grande could drill a second well within that 505 proration unit; however, with the Brown Well already producing the allowable for the proration unit, we wouldn't be allowed to produce that other well or we'd have to cut the capacity of both of them, and economically, that doesn't make a lot of sense to drill a well and to have it sitting there because the other well on the proration unit is producing at the allowable is an economic waste of the company's money or producing it at a lower rate so both wells can produce, is not a very effective means of investing money, yet the West Lindrith operators are able to offset within 330 or 790 feet from our proration unit where we have a well sitting there well over a half a mile, close to three-quarters of a mile away from that proration unit, and don't -- I don't believe that that is an equitable situation.

We could go up to the Marauder Well in Section 8, also on a 505-acre proration unit. That well is not restricted by allowables yet but it's within 100 MCF of its allowable restriction; therefor, if I was to propose a second well in that 505 to offset two wells that would be drilled in Section 12 of 25, 3, that well would have a maxi-

mum productive rate of 100 MCF a day, which figures out with poolwide GOR's of the Gavilan-Mancos right now, at about 30 barrels a day.

Some people may be able to live with those kind of economics but I don't think Mesa Grande can.

Q So is it your opinion that unless a buffer zone and a realistic formula is adopted that Mesa Grande cannot effectively protect itself against drainage from probably wells that will be drilled on the West Lindrith side of the line --

A That is correct.

Q -- under the current rules and proposed rules.

A Yes.

Q I'd now like you to refer to what's been marked Exhibit F-6 and ask you to explain this.

A Mr. Chairman, before you unfold F-6 and cover up F-5, I would like you -- I would like to point out to you that the Exhibit F-5 has the cross sectional trace of this next exhibit on it and it is, in fact, an expanded cross section of the one that I produced last month.

Q Last month you included the Reading & Bates well and the Brown well.

A That's correct.

Q Now we're taking the two wells in the

east and west of it.

A As I said, Mr. Chairman, I expanded this cross section to include to the east the Jerome P. McHugh Janet No. 3 and I'm sorry, that should not be Sun Exploration well, and to the west, the ARCO Gardner No. 13-1.

This is a stratigraphic cross section, as the previous one was, to show the geological tops. The Commission ordered pool boundaries and their vertical limits and the perforated intervals within these wells and any production data that I could -- could come up with.

I am sorry this isn't real current. At the time that the -- I had to get this from my draftsman, I had not yet got Sun's Septemer production and so production on this cross section is the August data and will not match the production data on Exhibit F-6.

I would like to point out again the -- on the west side of this cross section, the ARCO well and I would like to say that the Dakota interval, which I pointed out earlier, was treated and has produced approximately 900 barrels of oil, subsequently plugged off and recompleted in the Mancos interval and we were to correlate across to see that the perforated intervals within all these wells are very similar.

Q In your study of these logs that are shown on this exhibit, and analysis, do you see any geologi-

cal distinction between the ARCO well, the Gardner, and the Sun Janet No. 3, or for that matter, between or among any of these?

A No, I don't. There is structure log -- electric log characteristics of all these wells, not only on this cross section but all in the Gavilan-Mancos area and into the West Lindrith, they are very similar and there doesn't seem to be any difference to me.

Q In your analysis of the other wells shown on Mesa Grande's F-5, and some of which you discussed, the Hixon wells and what have you, do you find those wells perform in a manner characteristic of the wells in the western part of the Gavilan-Mancos Pool?

A Very much so. I think it indicates the amount of fracturing present.

Q So would you disagree with Mr. Kendrick that by happenchance (sic) the Commission's decision to place the pool boundaries along the township line happily corresponds with the geological distinction?

MR. KELLAHIN: Mr. Chairman, I'm going to object to this geologic witness talking about well performance and the capacities of wells to produce until he's qualified in that field.

MR. LEMAY: He's qualified as an expert. I don't understand your objection.

MR. KELLAHIN: He's qualified as a geologic expert.

MR. LEMAY: Correct, yes.

MR. KELLAHIN: Right, and he's making a comparison now about the quality of production of wells in the various areas.

MR. LEMAY: Oh, Mr. Kellahin, I think a geologist can talk about production.

Q This exhibit does, in fact, reflect the reported initial potentials of the wells as you've been able to ascertain them?

A Yes, they are.

Q I think Mr. Kellahin interrrupted my last question which was do you, in fact, disagree with Mr. Kendrick's statement that the administrative boundary line along a township line happens to correspond with the geological separation of the two pools?

A No, I do not.

MR. STOVALL: I object to that. I don't believe he exactly and accurately reflects Mr. Kendrick's testimony and I object to the question.

MR. LEMAY: Okay. Mr. Lopez, why don't you just ask him what he thinks about the geology and the boundary line?

Q Do you think that there is exists a geo-

logic boundary or separation between the wells in Township 25 North, Range 2 West, and the wells in 25 North, 3 West?

A No, I do not, and I did testify to that last month, that I do not see any good geological basis for putting that -- those pool boundaries at that common point.

Q Do you see a third geological distinction on the -- outside the eastern boundary of the Gavilan-Mancos separating it from the West Puerto Chiquito?

A I -- I feel there is a good geological boundary; however, it does not approximate where the administrative boundary currently exists.

Q Were Exhibits F-1 through F-6 prepared by you or under your supervision?

A F-3.

Q Oh, F-3 through F-6, sorry.

A Yes, they were.

MR. LOPEZ: I would introduce Mesa Grande's Exhibits F-3 through F-6.

MR. LEMAY: Without an objection they will be admitted into evidence.

Cross examination of Mr. Emmendorfer?

MR. KELLAHIN: Just a few questions, Mr. Chairman.

MR. LEMAY: Okay. First Mr.

Kellahin, then Mr. Stovall.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Emmendorfer, let me refer you to F-5, the structure map. The production information that you have placed adjacent to each of the wells, the first number on top is the initial potential for the well?

A That is correct.

Q To what use in your analysis of this issue have you made of the initial potentials of the wells?

A Could you repeat that, please?

Q Yes, sir. You've drawn our attention to the fact that you put the initial potential information adjacent to each of the wells and I asked you in making your analysis what, if any, use you have made of comparisons of initial potentials among or between wells.

A Well, I didn't -- I don't believe I compared any of these wells, their initial potential to their production here today. I just wanted to show what the reported potential production of each of these wells were.

Q Correct me if I'm wrong. Was not the inference made by a comparison of the initial potentials for certain wells in the Lindrith to show their similarity in initial potentials to wells in the Gavilan? Were you trying

to draw that comparison?

A That comparison could be drawn, yes.

Q Have you attempted to draw a comparison between the actual producing rates of those wells in West Lindrith with those in Gavilan?

A On a highly scientific basis, no.

Q Well, let's look at an unscientific basis for a moment on Section 34 in the Hixon B Geiger Well No. 1?

A Yes.

Q You show an initial potential of 612 barrels of oil per day?

A Uh-huh.

Q Are you aware on October 22nd of this year the current producing rate for that well was 95 barrels of oil per day?

A No, I'm not.

Q In Section 27 to the north on the ARCO (unclear) No. 1 Well, the initial potential on that well is 420 barrels of oil per day?

A Uh-huh.

Q Are you aware that after two years of production the current production on a daily oil rate is about 25 barrels a day now?

A I -- I guess that's probably correct. You probably have better sources than I do.

Q You've talked about the potential for drainage between the two pools in response to one of Mr. Lopez' later questions. Is -- is your opinion based upon drainage, is that conditioned upon your earlier exhibits that show your hypothetical drainage radiuses on some of these displays?

A No, it is not.

Q Have you attempted to use the hypothetical drainage radiuses in reaching your conclusions about the potential for drainage across the pool boundary?

A I don't know if I concluded any potential for drainage across the boundary.

Q In looking at the drainage circles that you've placed on Exhibit F-4B, when you described for the acreage in Section 25 and 30 a 160-acre drainage radius, is that simply a reference to the amount of surface acreage that's either in Section 25 or Section 30?

A Not exactly.

Q All right, if you look at the 41 acres that are shaded in yellow --

A Yes.

Q Have you simply planimetered the amount of acreage contained within that circle that's on the east side of that boundary line?

A No, I used a mathematical calculation,

which is more precise than planimetering.

Q Does the hypothetical drainage radius include any actual geologic or engineering information about the actual drainage that could be hypothecated for this pool?

A I don't believe I understand your question. Would you repeat that, please?

Q Certainly. I want to know if in determining this drainage radius what assumptions the hypothetical takes. Have you assumed a homogeneous reservoir of uniform thickness having the same reservoir characteristics contained within the circle?

A No, what I did was simplify the case where you have drainage to a wellbore from a rectangular proration unit and there is quite a few ways that we could hypothesize that drainage occurs.

The most simple, and a way that most governmental agencies look at drainage calculations, they use the circular method.

Q And the circular method used by the Bureau of Land Management is one that assumes a homogeneous reservoir of a constant, uniform thickness of the same reservoir characteristics.

A I can't say. I've never worked in the ( unclear).

Q Have you taken into consideration in the drainage calculation the effect that production will have from the Full Sail No. 4 Well that's within that drainage circle?

A Again I did not look at actual drainage between any well. It's just a hypothetical case of acre per acre drainage approach, diffent size proration units.

Q If the hypothesis includes the existence of the Sun Full Sail No. 4 Well, will that change the shape of the drainage from a circle to some other shape?

A It could possibly. Both of those wells would be competing against each other and that is the idea of compensatory drainage.

Q How useful is this hypothetical radial drainage calculation to us in discussing the fractured production from wells in the Gavilan-Mancos when compared to the West Lindrith?

A There has been testimony at previous hearings that the fracture direction is multidirectional, not one orientation. So I think it's still a circular drainage radius probably until proven otherwise, an easily visual method of determining drainage overlap.

Q Thank you.

MR. LEMAY: Mr. Stovall?

MR. STOVALL: Oh, Mr. Kellahin

did such a fine job I'll send him a check and pass the cross examination.

MR. LEMAY: Additional questions of the witness?

QUESTIONS BY MR. LEMAY:

Q I have one I'd like to explore with you just a little bit, Mr. Emmendorfer.

A Okay.

Q Assuming that -- that your Exhibits F-3 and F-4B were less diagrammatic as to or less applicable to drainage and more of an encroachment, and as I understand the position of Mesa Grande, or at least the testimony, that your -- there's some inequity you feel because on the West Lindrith side you can put two wells against one because you have 160's versus roughly 320's; that if that situation could be equalized to some extent by adjusting the setback on the West Lindrith side to accommodate equal encroachment on both sides.

A Encroachment, possibly. I think what you would have to also deal with is the allowable situation. Again, this is simple -- simplified diagram and maybe encroachment might be one way of looking at it, but we saw in the testimony last -- last month with the disparities of the allowables per MCF and barrels of oil per acre, that if in-

deed both sides of this line were able to produce at an equitable or equal rate, then there -- I don't think there would be a problem. I think the setback would take care of that, but since there is a great disparity within the allowables on a per acre basis, this encroachment idea does not cover all of it.

Q But there again, assuming that all wells in an area are below the allowable limits so the allowable adjustment will not take place, if you're talking about drainage or if you're talking about encroachment, either one, would that tend to provide more equity, more protection of correlative rights by adjusting acreage encroachment on each side of the line separating the pools?

A Well, I don't think so. I see the problem not as what a particular well is capable of producing, more of the -- the allowables on a per acre basis, tht's where the equity needs to be addressed.

It is reflected sometimes in the amount of production of a particular well but on a per acre basis in a proration unit, and with the allowables, that is where the disparity, as I see it, comes into play.

MR. LEMAY: I have no further questions. Is there anything else? Redirect? If not, the witness may be excused.

Is there anything further in

Cases 9226/9227?

How about statements in the case? Would anyone in the audience like to make a statement in the case that hasn't been examined?

Well, at this point let's wrap it up with some concluding remarks. We'll reverse the order of final statements, I think, and we'll start with Mr. Stovall, then Mr. Kellahin, let's see, where do you come into that, Perry?

MR. PEARCE: Wherever you put me.

MR. LEMAY: Well, let's do it Stovall, Pearce, Kellahin, and Owen, in that order.

MR. STOVALL: Maybe I'll stand, I do better pacing.

Mr. Kendrick testified and as my appearance indicates, I'm representing interest owners an operators exclusively within the West Lindrith area of the pool, or excuse me, within the West Lindrith Pool area of this -- of this reservoir, and help, we want out. This situation, it's a correlative rights issue. It's a question of the equal right as defined in the statute, the right of each property owner to produce its just and equitable share of the oil or gas or both in the pool.

Right now we're talking about

two separate pools. We're talking about the West Lindrith Pool and we're talking about the Gavilan Pool. The problem really arises in the Gavilan Pool. The problem arises in the Gavilan Pool in that it has got a unique, unusual producing mechanism within the reservoir, the fractured system from which a large portion of the production comes.

I think the Commission certainly knows more about the Gavilan Pool than I do. You've spent a lot of time listening to it. The Gavilan problem, the Gavilan operators, at least Mesa Grande, is now trying to extend the Gavilan problem into the West Lindrith Pool and there's no reason to do so, no basis in fact, no basis in law.

Based on the definition of correlative rights in the statute and upon the Commission's mandate to protect correlative rights, there is no legal reason to adjust the allowable within the West Lindrith Pool because of reasons that exist outside the West Lindrith Pool.

Even if you could create a justifiable reason for adjusting that allowable, there's no reason to. There's no demonstrated reason to. This Commission can only enter an order based upon findings of facts, evidence to support that finding. We've heard a lot of testimony in this case; you've heard even more than I have.

The only proponents of the buffer zone are the Commission witness, who spent a small amount of time, and primarily, Mesa Grande Resources. They were on last month and they've put on more evidence today.

None of the evidence that they have put on supports the need for a buffer zone. They have not demonstrated any harm to anybody from conditions that exist in the reservoir that would justify a buffer zone to protect operators in two separate pools.

You've heard substantial evidence from other equally well qualified technical people telling you that there is no evidence of the sort of problems, the sort of communication, the sort of interference that has been found to exist in parts of Gavilan. There's no pressure testing indicating that what happens in Gavilan or West Lindrith affects the other pool. There's no evidence of drainage of any kind. The producing rates of the wells don't indicate a problem, and quite simply, if it ain't broke, let's not fix it.

Gavilan may have a problem. Gavilan apparently does have a problem. They've spent two and a half years and untold thousands of dollars and many hours of Commission time trying to determine what is the best way to produce that pool. As often happens in a situation like that, there has been a compromise solution

reached; not everybody is happy with it.

Operators in Gavilan are unhappy because their production has been restricted down from what it would be under a statewide allowable. The Commission made findings sufficient to support that. They're now saying, okay, we've had to suffer restriction, let's take that restriction and move it off over into another pool, even though we have no sound engineering or geological reasons for doing so.

What happens if you create a buffer zone to the concept of correlative rights? You now have West Lindrith Pool operators, a limited number of West Lindrith Pool operators, who are no longer allowed to produce their ratable share of oil and gas in a reservoir. You now have Gavilan operators who are allowed to produce more than their ratable share of oil and gas in the reservoir. That's contrary to the concept of the protection of correlative rights.

Now there is some question raised, I think, as to where the boundary should be between West Lindrith and Gavilan. I think the evidence is generally supportive of the idea that there's sufficient difference in the reservoir characteristics between Gavilan and West Lindrith to justify the existence of two pools. Exactly where that boundary should be is unclear and I think the

Commission understands that it is kind of a gray area, and administrative simplicity, perhaps, is a very good reason for choosing the boundary at the township line. If in fact there is a problem between West Lindrith and Gallup, (sic) then perhaps it's with the boundary.

Now I don't advocate a change of the boundary. I think it's a very logical and well supported location for the boundary. I think it should remain as is.

Mr. Kendrick testified as to the administrative burden of administering the buffer zone. While that is not reason enough in itself not to create a zone, a buffer zone, given the lack of any demonstrated need for the buffer zone, that's certainly additional reason not to take on a burden that's unnecessary for the protection of anyone.

Mr. Kendrick also indicated that there is no real, logical basis for the establishment of a buffer zone as proposed. There are wells outside of the buffer zone but within the same sort of reservoir situation that don't need a -- that are included in the buffer zone protection and may need that protection.

They've simply taken a township section line about a half mile on either side, essentially, and said, this is where we propose to do it. It's not even

limited to the -- to the boundary between the two pools. The Gavilan Pool does not extend the entire length of the West Lindrith Pool.

Northeast Ojito abuts up against what has been classified as some Gavilan wells. There's no buffer zone proposal created there.

To the south we don't even know for sure which pools some wells are in, although they've been identified as Gavilan wells. Perhaps they belong in West Lindrith. I don't know; I wouldn't propose to say.

From the standpoint of the operators of West Lindrith there is simply no reason at all to grant the relief requested in the application in Case 9226. There's no engineering or geological basis and there are sound engineering, geological, and legal arguments for not doing so.

The people I'm representing today own substantial acreage along that buffer zone area. They would like to be able to go in and develop that buffer zone -- their property, and I shouldn't say buffer zone any more. They would like to be able to go in and develop their property. They would like the Commission to issue an order telling them that they can do so under the rules of the pool in which they are located. Now if we discover later on that there's some need for adjustment, that's a new case. That's

not even a matter in evidence today.

We would ask that the Commission enter an expedited order denying the relief requested in Case 9226. Quite frankly, we don't care what happens in 9227. Gavilan needs to deal with its problems within its own pool and if an adjusted allowable is what they need to do, then that's fine, but we believe that in 9226 the Commission has no basis for entering an order which affects the allowable or changes the setback within the pool and to do so would be contrary to all of the evidence that has been presented in this case.

Thank you.

MR. LEMAY: Thank you, Mr. Stovall.

Mr. Pearce and/or Mr. Lund.

MR. PEARCE: Thank you, Mr. Chairman, I'll try to be brief about Amoco's position in this matter.

Amoco appears supporting a 790 setback on common boundaries lines between West Lindrith, Northeast Ojito, and Gavilan-Mancos wherever those common boundaries might appear. Presently the Northeast Ojito and the Gavilan have 790 setbacks. Where the Northeast Ojito, in which Amoco has all the interest bumped up against the recently expanded West Lindrith, we think the 790 setback is

the appropriate spacing for wells drilled in the future. We propose a grandfathering of any well that has already been drilled closer than 790 at full allowable. We think Amoco and the other companies who have drilled wells under different spacing rules have invested money and should be allowed to recover those sums with unrestricted allowables on those wells.

Amoco opposes the imposition of a buffer restriction on West Lindrith production. We think there are four reasons why such an allowable restriction is inappropriate.

First of all, and I suppose primarily, as we have discussed, the West Lindrith wells in large part are commingled with Dakota production. We've heard conflicting evidence from different wells about how substantial that Dakota production is, but we know that close to this area there is substantial Dakota production. We don't think an allowable restriction on the West Lindrith, which had the effect of penalizing Dakota production is in any way justified. We also think that the recovery of any West Lindrith well is presently being penalized to some extent because we believe that the GOR in the West Lindrith and -- excuse me, in the Dakota zone may be higher and that has the affect of already reducing that production.

Second, we heard testimony to-

day that there may be a pressure sink in operation causing flow from the West Lindrith to the Gavilan already. To impose a further production restriction on those West Lindrith properties only exacerbates that problem and causes a more extensive drainage across that line.

We don't think that's appropriate.

Third, we have very little evidence because of the limited development in the proposed buffer zones. We don't know. If everybody has been talking about well, maybe if we drill a well somewhere and maybe if we get some level of production, maybe we'll have a problem. I don't think maybes are an appropriate rule-making basis for this body.

Fourth, we heard extended testimony in the past about a fracture system being the predominant production mechanism in the Gavilan. I expressed no opinion on that at that time, at this time, but if that is correct and if, as we've heard today, that fracture system is less prevalent in the West Lindrith than it is in the Gavilan, then once again any allowable restriction in the West Lindrith will further penalize those wells unjustifiably. We don't think that's appropriate.

We are concerned because of testimony we've heard today that Sun's presentation based

upon averaging of well capabilities when we're confronted with a situation when well capabilities vary so widely, misses the mark substantially. The way wells vary out here, we don't believe averaging is any appropriate basis to make predictions and I'm afraid we are not going to know what wells out there will do until they're drilled and I don't think that it is appropriate in the absence of that knowledge to put restrictions on those wells at this time.

Finally, Mr. Chairman, if the Commission decides that a buffer zone of some kind is appropriate, there is a precedent in the Northeast Ojito Gallup-Dakota Pool to the northwest of the Gavilan. A buffer zone is in fact in place in that pool at this time. It was put there largely because of different size spacing units; however, all of that buffer is in one pool. The parties did not request, the Division did not find, that it was necessary to have a buffer operate on both sides of a common pool boundary in ordere to protect rights. We do not think that is necessary or appropriate at this time. We believe that if the Gavilan operators think some adjustment to allowables between these pools is necessary, that all that adjustment should be made on the Gavilan side of that boundary and that the West Lindrith operators should be allowed to proceed and develop their acreage.

Thank you.

MR. LEMAY: Thank you, Mr. Pearce.

Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Chairman. Gentlemen of the Commission. I would like to begin with the point that Mr. Pearce concluded with and that is what precedent the buffer gas allowable established in the Northeast Ojito has and what usefulness that might present for us in resolving the issue between Gavilan and Lindrith.

I would do just the opposite of what Mr. Pearce has suggested. If you recall in the Northeast Ojito, that was a pool spaced on 160 acres in which it had a higher gas allowable than the pool immediately to the south spaced on 40's. The pool with the 40-acre spacing, that allowable wasn't increased; conversely, it was the well with the larger spacing with the higher allowable, and that's the key, the higher allowable was reduced.

In the Gavilan area and West Lindrith we have the West Lindrith with the higher allowable. It's an artificial, hypothetical, gas allowable; why not reduce that?

Why? Because we have spent hours before this Commission trying to prevent waste and protect correlative rights in Gavilan and you have found

that Gavilan needed protection with restrictive rates.

Why use the artificial reasoning of a higher gas allowable in Lindrith as an excuse to now bump up the gas allowable in Gavilan that you've spent so much time controlling? It seems to gut the very underlying pinnings upon which Gavilan reduces -- production rates were reduced.

How did we get here? Well, my understanding and recollection is the Gavilan line got to the township line first. When you look at the spacing in that pool they were at the short tier of sections first with the exception of Section 1 up near Northeast Ojito.

What has happened? By administrative act a significant portion of that no man's land where it wasn't spaced, West Lindrith was jumped over.

When West Lindrith was moved over to this common line, I believe the West Lindrith side of that line ought to bear the burden of coming forward to the Commission and proving that wells drilled within a mile of that line on their side do not dlisrupt all the work that's been done in Gavilan. I don't think that's unfair. The wells in that buffer side on Gavilan -- on West Lindrith now were permitted and drilled under Gavilan rules. They have notice of that fact now. It's always easier to go from wide spacing down to smaller spacing but if we don't control

what happens on the Lindrith side now, you'll lose control of it. You'll lose all flexibility and all options to do what you would like to do.

At the very least I would suggest, and I concur with Mr. Lopez, that there ought to be at least a very minimum distance of pool well locations along that property line. 790 I think is a useful number; however, I suggest to you that within a mile on the Lindrith side, within a mile, a mile and a half, or two miles, we need to establish a procedure whereby if companies want to drill on the Lindrith side in proximity to the Gavilan boundary, that they're required to come before the Commission and prove that their well once drilled and completed will not adversely impact the drainage problems we have in Gavilan. Put the burden on the applicant to come forward and see that he justifies a higher gas allowable. Don't simply give it to him now.

The evidence of Sun has shown you there's no reason to do it.

I'm opposed to grandfathering the wells in Lindrith. I think that ignores the problem. There is a difficult problem to resolve in Section 1 with the Minel wells in relationship in Northeast Ojito. I'm reluctant to grandfather those. I think without a particular hearing with regards to the drainage influence among those

wells I would not blanketly grandfather those but require again the applicant to come forward and prove that they justify or deserve a higher allowable than that allowable is restricted in the Gavilan.

There are a lot of things, I think, that we can agree about in this hearing, the well location question. I think it's common practice and I think it's useful to utilize the short tier of sections as a boundary. No one has serious objections to that.

My biggest problem is I think with the gas allowable that Mr. Sweet has proposed. As I see it, it's not justified. There's no reason to have it. I see no need for the regulation of the gas allowable. It appears to me to be an artificial justification to grant to Mesa Grande and the Brown Well, which is the only well that will benefit in the buffer area from this step rate top allowable adjustment that Mr. Sweet proposes. It's the only well that benefits. Why does he propose it? Looks like a sweetheart deal to me. I think -- I think he benefits from it and no one else does.

I'm very much concerned about creating two gas allowables within the same pool, whether you do it in Lindrith or whether you do it in Gavilan. I think that's a serious, serious problem and unless you have substantial evidence that drainage is occurring across the

boundary line between the two pools, I would urge you not to take that action. I think it's very difficult to defend establishing different gas allowables within the same pool and that's what will occur.

Within Gavilan internally you're going to have an area in which the allowable is higher than immediately offsetting Gavilan wells in admittedly the same pool. That's a disparity that I think is not warranted.

The question was whether or not there is an economic incentive to do this. Do we need that to encourage development in either Lindrith or in Gavilan? Is there a reason to do it? The testimony has been there is no reason to do it. The docket yesterday at the examiner had a case on it for Mesa Grande. They were seeking a pooling order for Section 14 in Gavilan. Under the restrictions we are operating now they're willing to spend money and drill wells.

Look at the development that's going on in West Lindrith. It's not an impediment. They are finding wells in there that are not capable of producing high gas rates and they're drilling them anyway. I believe that there's not a sufficient economic justification to cause you to adopt a buffer gas allowable.

If you decide to do one, we be-

lieve that as fatally defective as it may be, the one proposed to you by Sun is certainly more equitable. It's a gradual percentage adjustment as we cross between the pools and perhaps that works. We think it's significantly better than the one Mr. Sweet proposes where the bumping of the increments of volume, the disparity in going within Gavilan from one level to another that's a change of 178 percent is too great and not warranted.

We believe that you can write a special pool rule order for West Lindrith that preserves correlative rights, protects Gavilan, and allows the operators in West Lindrith to have fair and reasonable notice of what they do when they begin to drill a well in proximity to the adjoining pool.

We believe that that order can be written without the use of a top gas allowable buffer allocation. We don't believe that's warranted.

If you would like me to, I would be happy to submit a draft order on this case.

Thank you.

MR. LEMAY: Thank you, Mr. Kellahin.

Mr. Lopez.

MR. LOPEZ: Thank you, Mr. Chairman. I'm sure, in fact I'm confident that the problem

that we're addressing here today is not one of Mesa Grande's creation but is one of our opposition's creation.

We have consistently since the outset resisted the imposition of restricted allowables in Gavilan and we continue to think that the current special pool rules are insane and we would hope that we would be able to persuade the Commission to see the problem a little differently come next spring.

The problem and it is inconceivable to me that the Commission won't tackle it, the problem seems to be so clear and so obvious, is one that my counterparts seem to be refusing to address. There is no -- the Commission is clearly charged with the duty of preventing waste and protecting correlative rights. I think the facts before you are indisputable; that under the existing scheme of things there is no question that the correlative rights violation will come into question. We have several basis for that conclusion.

The first, we have the setback requirement and I must say that it is reassuring that although all the opposition has suggested there's no need for any buffer zone, they're all willing to agree that except for the fact that we do need a buffer zone, at least for the purposes of setback. There doesn't seem to be any question with respect to the setback.

The second problem that you are clearly confronted with is the difference in spacing rules between the two pools. We have 160's on one side and a hodge-podge but presumably 640's on the other, with the particular sections we're concerned with being of 505 makeup.

The most serious problem is the one of the difference in allowable structures. We have been curtailed to a 600-to-1 ratio in Gavilan whereas West Lindrith continues to produce at 2000-to-1 ratios. That gives them in the West Lindrith a decided advantage. If we were not so restricted in Gavilan, nothing would give me greater pleasure than not to have the problem with us and let West Lindrith continue to produce as they wish, but that's not our problem We're having to deal with a problem of fairness, of equality, of treating royalty owners, leasehold owners, working interest owners on both sides of this imaginary boundary as equally as possible under the existing circumstances. It's a problem that I think you must and have to address.

The suggestion has been made quite erroneously that Mesa Grande is motivated by its own self-interest with respect to the Brown Well. Well, this is one of those situations where we find ourselves rather naked because we came to the Commission originally in this hearing after meetings in Farmington where it seemed to be a

consensus developing among all attending those meetings, and I think you will know as well as I do, and a suggestion was made that somebody should come up with a suggestion to solve the problem, and that was a bona fide effort that we made in the first day of these hearings.

All of a sudden everybody had run for cover. It is clear from the testimony of Mr. Emmendorfer that the wells in Section 8, 17, 20, and 29, all will be benefitted and two of those are Sun's wells and two of those are our wells, if there is some formula adopted as we have suggested or even as Sun has suggested.

The problem, however, becomes the one that Mr. Emmendorfer also tried to explain. The existing wells in our 505-acre units that border the boundary line already are being restricted on production and what madness it would be to go and drill a second well at our option on that when it wouldn't be able to be produced at all or we'd have to further curtail the producing well and produce presumable the newly drilled well at tremendously curtailed rates.

This in comparison to the ability of the West Lindrith operators to drill right along the border line and produce at much higher allowables. The clear violation of correlative rights is so transparent it defies explanation.

Mr. Pearce has suggested on behalf of Amoco several reasons why the buffer zone and the formula suggested with respect to adjusting allowables should not be adopted.

One is that the West Lindrith is allowed to commingle its Dakota production with its Mancos production. I think an examination of the wells on both sides of the buffer zone will indicate to the Commission that the supposed contribution of the Dakota is not a problem at all. The problem is the fact that there does not exist, as clearly demonstrated by the cross section, any geological distinction between the wells in the tier of sections in both pools adjoining the boundary line and the Dakota production on either side of that very boundary line we're discussing is not of significant note.

There has been a suggestion made here today that in fact the -- there's a pressure sink for the benefit of the Gavilan and if the Gavilan is going to do anything, it's going to drain West Lindrith.

I would suggest to the Commission that a clear and accurate review of the record will show that any such suggestion is based on flimsy or nonexistent evidence. In point of fact, we have no idea what the difference between the pressures on the West Lindrith side of the border are and those in Gavilan. We do have good

pressure information in Gavilan. We have virtually no pressure information in West Lindrith and there's no dispute that there's been almost no development along the West Lindrith portion of the common border.

There has been a suggestion with respect to my or our argument that unless the situation is corrected that there will be a chilling effect on any economic development clearly that Mesa Grande would envision and undertaking on its acreage in the Gavilan because there was a case where we were seeking to drill a well before the Division yesterday. It is clear with all these wells that are being proposed to be drilled are on 640-acre spacing where they have the maximum benefit of the restricted allowables in the Gavilan and that none of these wells are similar or comparable to the problems we're addressing along the buffer zone in the Gavilan.

The final point I would like to make is not that it's so transparently clear that there does exist a serious correlative rights problem, one of Sun's and McHugh's making because of their successful exercise in persuading the Commission that their view of the producing characteristics of the Gavilan, at least so far, are more meritorious than those that we have been promoting, but there is the suggestion that we can wait and not have any rules to play with but address the problems on a case-by-

case basis.

I would suggest to the Commission that one of the problems of the Commission during the last few years has historically been that we have not had any rules on which we can rely and that may have contributed to the change of administrations.

We have the situation here that the bitter feelings that have been experienced in the Gavilan are as a result of having the rules of the game changed in midstream, where millions of dollars were risked on the basis of certain expectations and those expectations have been dashed, and wells that are capable of producing at much higher rates have been severely curtailed.

It would seem to me that it would in the Commission's very best interest to set the rules of the game on a clear, clearly established basis so everyone going in can know what the rules are along this buffer zone until it can again address the problems of restricted allowables in Gavilan in the spring.

It is on that basis that I believe that the Mesa Grande formula, arbitrary as we said it was, but it is an effort to come up with some sort of equitable apportionment across these two sections buffer zone wins out over the Sun proposal for two reasons. One, the Mesa Grande proposal has a less adverse impact on the West

Lindrith acreage and secondly, if and when, hopefully, the Commission lifts the restricted allowables in Gavilan the Mesa Grande formula will work whereas the Sun proposal will not.

Thank you.

MR. LEMAY: Thank you, Mr. Lopez.

Any additional statements in these cases?

If not, the Commission will take the case under advisement.

(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 (Commission) 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