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

25 September 1985

EXAMINER HEARING

IN THE MATTER OF:

Application of Benson-Montin-Greer Drilling Corp. for an unorthodox oil well location, Rio Arriba County, New Mexico.	CASE 8695 8714
and	
Application of Benson-Montin-Greer Drilling Corp. for the amendment of pool rules, Rio Arriba County, New Mexico.	CASE 8715

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

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I N D E X

E X H I B I T S

MR. STOGNER: We'll call next Case Number 8695.

MR. TAYLOR: The application of Benson-Montin-Greer Drilling Corporation for an unorthodox oil well location, Rio Arriba County, New Mexico.

MR. PADILLA: Mr. Examiner, Ernest L. Padilla, Santa Fe, New Mexico, for the applicant in this case and we'd ask that all of the Benson-Montin-Greer cases be combined and consolidated for hearing.

MR. STOGNER: Are there any objections to consolidating Cases Number 8695, 8714, and 8715, Mr. Padilla?

Are there any objections?

At this time we will call Cases Number 8714 and 8715.

MR. TAYLOR: The application of Benson-Montin-Greer Drilling Corporation for an unorthodox oil well location, Rio Arriba County, New Mexico, and the application of Benson-Montin-Greer Drilling Corporation for the amendment of pool rules, Rio Arriba County, New Mexico.

MR. STOGNER: Are there any other appearances in any of these cases?

MR. JOHN ROE: Mr. Examiner, I'm John Roe, with Dugan Production, and I'm not here to

make an appearance but I do have a letter which I would like to give, two copies of this letter.

The letter, in summary, indicates that Dugan Production and Jerome P. McHugh are in support of Mr. Greer's applications and support what he's trying to accomplish in addressing the dissimilar spacing in the Gavilan Mancos and West Puerto Chiquito.

We'd like to have this letter made part of the record. They are identical copies.

MR. STOGNER: Thank you, Mr. Roe. Were copies of these made to the applicants?

MR. ROE: Yes, sir.

MR. STOGNER: Okay, thank you.

MR. CARR: Mr. Stogner, my name is William F. Carr with the law firm of Campbell and Black.

I'd like to enter an appearance for Mallon Oil Company.

MR. STOGNER: I'm sorry, who?

MR. CARR: Mallon Oil Company. I do not have a witness.

MR. STOGNER: How do you spell that.

MR. CARR: M-A-L-L-O-N.

MR. STOGNER: Do you wish to enter an appearances in all three cases?

MR. CARR: Yes, sir.

MR. STOGNER: Thank you, Mr. Carr.

Are there any other appearances?

MR. DAN NUTTER: Dan Nutter, Mesa Grande Resources, Inc. All three cases.

MR. STOGNER: Any further appearances?

MR. BUETTNER: Yes, sir. I'm Robert Buettner. The last name is spelled B-U-E-T-T-N-E-R.

I'm General Counsel for Koch Exploration Company; that's K-O-C-H.

I'd like to enter Koch's appearance in all three cases. We do not have any witnesses to call but we would like the opportunity to make a brief statemet for the record at the close of the case, or the cases, I should say.

MR. STOGNER: Are there any other appearances?

If not, please continue, or Mr. Padilla, do you have any witnesses?

MR. PADILLA: Mr. Examiner, I have one witness to be sworn.

MR. STAMETS: Will you please

stand and be sworn?

(Witness sworn.)

ALBERT R. GREER,

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

DIRECT EXAMINATION

BY MR. PADILLA:

Q Mr. Greer, will you please state your name and tell us what your connection with the applicant, Benson-Montin-Greer, is in connection with Cases 8715, 8714, and 8695?

A I'm Albert R. Greer. I'm an officer of Benson-Montin-Greer Drilling Corp., who is the unit operator for the Canada Ojitos Unit which lies within the West Puerto Chiquito Pool, which is the pool about which I have some special pool rules.

Q Mr. Greer, have you also testified as a petroleum engineer in connection with the West Puerto Chiquito Pool and other operated -- properties operated by Benson-Montin-Greer?

A Yes, sir.

Q And have your credentials been accepted as

a matter of record before the Division and the Commission regarding that testimony?

A Yes, sir.

Q Have you made a study and prepared certain exhibits today in connection with these cases today?

A Yes, sir.

MR. PADILLA: Mr. Examiner, we tender Mr. Greer as an expert petroleum engineer.

MR. STOGNER: He is so qualified.

Q Mr. Greer, would you briefly state, first of all in Case 8715, for all three cases tell us what you're trying to accomplish by those cases?

A Yes, sir. In Case 8715 we address the problem of spacing of wells, location of wells and allowables, along the boundary between the West Puerto Chiquito Mancos Pool and the Gavilan Mancos Pool, and the area north of the Gavilan Pool.

The other two cases deal with unorthodox locations along this boundary.

Q Okay. Now you've prepared evidence and documentary evidence for this case which addresses all three cases, right?

A Yes, sir.

Q Would you turn now, first, to what we

have -- to what you have --

MR. PADILLA: Mr. Examiner, we have it marked as Exhibit Number One, but we will call it Exhibit Number One for all intents and purposes, the whole thing.

MR. NUTTER: And this, Mr. Padilla, will be Exhibit Number One in all three cases?

MR. PADILLA: Yes.

Q Mr. Greer, would you turn to the first page of that?

MR. PADILLA: Well, first of all, before I proceed, Mr. Examiner, let me ask that administrative notice be taken of previous cases before the Oil Conservation Division and the Commission, and those are cases involving the establishment of the West Puerto Chiquito Pool and the Gavilan Mancos Pool, which about a year and a half ago was established adjoining the West Puerto Chiquito Pool to the west.

The Gavilan Mancos Pool was considered under Case 7980 and an order was issued in that case, R-7407.

The West Puerto Chiquito Mancos Pool originally was considered under Case 3455, with the issuance of Order 2565-B. That order has been amended from time to time to reflect the various operations that have

been conducted by the operator of the pool, Benson-Montin-Greer Drilling Corporation, and there are various subsequent orders that have been issued with regard to that case.

From a historical perspective, insofar as today's case is concerned, we believe that there has to be a recognition that the Gavilan Mancos Pool and the West Puerto Chiquito Pool, and the common boundary of both pools, are actually one and the same pool, though by nomenclature and by the cases that I have cited to you have established separate pools.

The basic purpose that we are here for today is to address the problem that is going to come up eventually, and may have already come up, regarding cross boundary drainage, and that is the purpose of today's hearing, is to how to address the drilling of the wells along the common boundary of those pools.

With that, I'll commence.

Q Mr. Greer, would you turn now to the index of your --

MR. BUETTNER: Mr. Examiner, may I just have a point of clarification with Mr. Padilla? Is he asking that the record reflect, is there indeed a record which reflects a finding on behalf of this Commission at a previous time that the Gavilan Mancos Pool and the West Puerto Chiquito Manco Pool are indeed a single pool?

If there is not, I don't believe there should be such a -- if it's implied that that finding exists, I'm not aware of it.

MR. PADILLA: Mr. Examiner, if I may clarify that.

We are -- basically what I'm -- my opening statement is intended to address is that there is a problem with drainage between both pools which involve the same formation. For nomenclature purposes one, the Mancos Pool has been segregated from the West Puerto Chiquito Pool basically because of the Canada Ojitos Unit, which is operated by the applicant in this case, and the western boundary of the Canada Ojitos Unit and the West Puerto Chiquito Unit are one and the same.

MR. STOGNER: Mr. Padilla, the way I understand it, you're asking that we take administrative notice of those cases that involve the establishment and the amendments and the extensions, contractions, whatever, that took place in both the West Puerto Chiquito Mancos Pool and the Gavilan Mancos Oil Pool, is that correct?

MR. PADILLA: That's correct, and if my statement implied something else, then I obviously withdraw it.

MR. STOGNER: Mr. Buettner, is there any problem with that?

MR. BUETTNER: No, I think that clarifies that point. Thank you.

MR. PADILLA: Mr. Examiner, let me specifically identify two other cases that should be considered and administrative notice taken of them with regard to the West Puerto Chiquito Pool, and that is Cases 6997 and 7075.

MR. STOGNER: I'm sorry, what?

MR. PADILLA: 7075.

MR. STOGNER: 7705?

MR. PADILLA: Seven zero seven five.

MR. STOGNER: And what did those cases entail?

MR. PADILLA: They entailed spacing changes in the West Puerto Chiquito Pool.

MR. STOGNER: In other words, amendments to those orders?

MR. PADILLA: Correct.

MR. STOGNER: I don't have a list of all those cases. Maybe I should get one at this time to satisfy everybody here, but I thought I would entail that whenever I said I would take administrative notice on those cases that, first of all, established both the Gavilan Mancos Oil Pool and the West Puerto Chiquito Mancos Oil

Pool, and those cases that either extended, contracted, horizontal or vertical limits of either one of these pools, or made amendments to any pool rules of both the Gavilan Mancos Oil Pool and the West Puerto Chiquito Mancos Oil Pool.

Did I leave anything out?

MR. PADILLA: I don't think so.

MR. STOGNER: Okay. Please continue.

Q Would you turn to the index, Mr. Greer, of that Exhibit Nubmer One and please briefly state what that is and how it dovetails with the rest of the Exhibit Number One?

A Yes, sir. If I may, I would like to point that we recognized two years ago when the Gavilan Mancos Pool was established that there would be a problem of needing wells across the boundary with 320-acre spacing on one side and 640-acre spacing on the other side.

We considered at that time putting on exactly what we're putting on here today, but because of the involvement and the problems that appeared in establishing 320-acre spacing in Gavilan, we deleted this part of our -- of our presentation at that time, and at that hearing two years ago we did make provision that the wells in Gavilan Pool which joined the boundary of West Puerto Chiquito, there would be only one well in the east half of the sec-

tion, and that was to allow or make the start toward an equitable solution to meeting the two spacing areas at a common boundary.

Today we've divided our presentation into six parts. I'd like to refer ot the index for those who would like to follow it.

In Part I we will deal with -- simply with orientation.

In Part II, where we have underscored language under Section C, we make the statement that fracture block reservoirs of West Puerto Chiquito and Gavilan do not require uniform spacing for efficient reservoir recovery.

In Part III we review the principles of compensating drainage for uniformly spaced wells located off-center of proration unit.

In Part IV we go to the basic issue of cross-boundary migration where there is a difference in size of proration units. In this instance the wide spaced area is unitized.

Then in Part V we look at some well patterns at the boundary between areas of different size proration units and how -- how this might be treated.

And I would like to point out at this point that one of our concerns is to meet this problem or

cross boundary migration with a minimum of wells and to avoid the waste resulting from the drilling of unnecessary wells.

Part VI we summarize these cases.

Q Let's turn now to what you have -- to your Tab A and tell the Examiner what that is.

A Part A is an orientation plat which also has the general structure of -- as contoured on top of one of the markers in the Mancos.

The West Puerto Chiquito Pool is outlined by a stipple that can be identified on the bottom of the map, the center township, Range 1 West; can be followed up the west township line of Range 1 West.

There's a green vertical line which separates, or is the boundary between West Puerto Chiquito and the Gavilan Pool. The north part of the green line is where the West Puerto Chiquito Pool meets what we hope will be an extension of the Gavilan Mancos Pool, which is outlined in the red dashed line, and the application, as I understand, for that extension is -- has been made in cases set to be heard October 9th.

The main part of the Gavilan Pool and extensions, which I think have either been granted or are in the process of being granted, are shown in the lower left-hand part of the map under Gavilan Mancos Pool boundary.

Q Where on this map is -- or does this map show your nonstandard location requests?

A Yes, they do. One is in Township 26 North, Range 1 West, Section 31 and the other is in Township 25 North, Range 1 West, Section 6; the Canada Ojitos N-31 Well and the E-6.

Q Now what's this area shown in yellow on your --

A We have shown in yellow the area which we believe generally to have been invaded in our gas -- by gas from our pressure maintenance project. It's just schematic but in general it covers an area about that which would have been displaced by the production of the amount of oil that's been produced from the reservoir.

The -- in connection with that the wells with triangles, green triangles, are injection wells.

The blue colored wells are wells that are shutin, either observation wells or wells that were shut in when their gas/oil ratio increased.

Q Where do you -- where do you get the gas for your injection wells?

A We gather all the gas that's produced from the wells in the unit and then we purchase additional make-up gas.

Q Does part of your presentation today in-

clude some testimony concerning the integrity of that maintenance, pressure maintenance program?

A Yes, sir, we are -- our wish list, I guess you might call it, is we would like to continue the pressure maintenance project. We think it's been very effective. We can recover as much as ten times as much oil from those parts of the reservoir susceptible to gravity drainage as by solution gas drive, so we want to maintain the pressure maintenance project if we can.

We also want to prevent cross boundary migration from West Puerto Chiquito to properties to the west, and we would like to do all that with a minimum number of wells, so we have three objectives.

Q Okay. Now as -- what do the contour lines on this map show?

A It's contoured on the "A" marker in the Nibrara member of the Mancos. They show generally a dip of the formation from the point at which it outcrops on the righthand side of the map with a dashed line, to the west; the dip gradually leveling off.

It shows a nose in the initial Gavilan area and a re-entrant along the east side of the common boundary between the two pools, a low spot.

Q Is this a -- is this called a gravity drainage reservoir?

A Well, parts of the reservoir where the dip is steep enough we have realized a substantial gravity drainage.

Q Where generally in relation to this does the -- you have --

A From the area about two miles east of -- well, from a mile and a half to two miles east of the common boundary onto the righthand side of the yellow-colored area is generally the area that we anticipate substantial gravity drainage.

Q So right along the common boundary between the Gavilan Mancos Pool and the West Puerto Chiquito Pool you have a flattening out of the reservoir?

A Yes, sir. We do not expect substantial gravity drainage in that area.

Q Let's turn now to what -- to your Tab B and explain that to the Examiner.

A Under Section B of Exhibit One we have reproduced the same exhibit as was in Case Number 7980, McHugh Exhibit Number Eight under Section W; reproduced here in order to -- to again bring to the Commission's attention the fact that the West Puerto Chiquito Pool and the Gavilan Mancos Pool are quite similar lithologically, whereas areas to the east and to the west are not.

This cross section covers the -- from

east to west in Township 25 North, and runs from Range 4 West to Range 1 East.

The two wells on the outsides of the cross section are outside of the two pools that we're discussing today.

It's pretty clear just looking at the colored parts of the cross section that there is a very close similarity of logs from -- in the two center wells, one of them being in West Puerto Chiquito, the other one being the discovery well, or the first well in the Gavilan area.

Of particular significance, we point out that going west over to the West Lindrith Gallup-Dakota Pool the formations lose the character that we find in Gavilan and West Puerto Chiquito; also north and east they lose character.

So we find a similarity in, a strong similarity in West Puerto Chiquito and Gavilan, which is our first clue that they're probably one -- one reservoir.

Q What are those red dots on the second well depicted on that cross section?

A The red dots show, the upper one on the second log from the left shows a point which circulation was lost in drilling the well. Ordinarily lost circulation indicates a fracture system and it's significant here in that

that point correlates with the same point in a well in the Canada Ojitos Unit which has produced roughly a million barrels of oil in Township 26 North, Range 1 West.

Q Does that mean there's natural fracturing underlying at least those wells?

A Yes, sir, we feel there's no question that there's fracturing, similar fracturing in the same -- same point in the reservoir, and a point which is not found in the other wells.

The lower red dot on that same log is another point of lost circulation and that correlates with the well in West Puerto Chiquito, the Canada Ojitos Unit A-16, in which we show a solid bar showing the area that's perforated in that well, and that's a zone that's produced some 6 or 7-million barrels of oil in Township 25 North, Range 1 West.

So these are significant, very significant lithologic character, characteristics, that point to the similarity of the -- of the two areas, and are distinct from other producing areas around.

Q Is this -- is this evidence that potential drainage could occur between the pools?

A Yes, sir, where -- where the high capacity fracture system appears to exist in both Gavilan and West Puerto Chiquito, there can be extensive cross-boun-

dary migration between the pools.

Q Do you have anything further to add to your testimony concerning this cross section?

A No, sir.

Q Let's go on now to what you have marked as your Tab C and explain the pages that you have in Tab C.

A The first page under Section C is a blue-colored sheet which shows schematically the type fracture system which we found in West Puerto Chiquito.

There we found a high capacity fracture system surrounding tight blocks and ordinarily when we drill a well it will be located in one of the tight blocks. Some of them are better communicated, or in better communication with the fracture system than others.

The lines which show the separation of the blocks constitute high capacity channels and there's absolutely no question that this is the kind of geometry that exists in West Puerto Chiquito. The wells' production and pressure behavior can be satisfied only by this kind of geometry; tight blocks surrounded by high capacity fracture system.

I'd like to go to the yellow sheet, then, the next sheet under Section C, and here we -- here we show the comparison of a tight block drained by an internal well or a tight block drained by the high capacity fracture sys-

tem. We'd have drainage either way.

On the lefthand side we show, for example, a well in a small tight block, and I've used circular blocks in this instance just simply through the simplicity of making calculations.

A well completed with a 400-foot fracture and with, as shown on the white sheet down below it with the pink-shaded figures, 100 barrels a day is what could be expected from a well producing from a tight block with a transmissibility of about .06 Darcy feet and 1500 pounds reservoir pressure; about 100 barrels a day.

Now that's the way these little reservoirs act. They act as just individual reservoirs with -- with constant pressure at the boundary. They're constantly supplied by oil in the high capacity fracture system.

Now, on the other hand, that same type plot can be drained by the fracture system itself without a well in it, and the comparison is shown by the righthand side of the yellow sheet and the white sheet. The drainage then occurs from the center out to the high capacity system. I've selected arbitrarily a 900-foot drainage radius to 1000-foot drainage radius. That area between those two radii represent about 20 percent of the total block's volume or area, yet the rate of production, if we impose on that the same pressure drop that we have for the well on the

lefthand side where there's a well in the block, if instead of producing from the outside to the center, we produce from the center to the outside, the initial instantaneous rate of production would be like 2000 barrels a day rather than 100 barrels a day, and would only take, as shown by the green shaded answer to the calculation just above, it would take about 20 pounds pressure differential for the high capacity fracture system to drain from that block at the rate of 100 barrels a day, from the 900-foot to the 1000-foot radius.

This means that the high capacity fracture system can drain these tight blocks without having a well in the block and it can drain it very efficiently, in fact more efficiently than a well within the tight block itself.

On the bottom of the white sheet I've shown the time it takes to -- to reach stabilization, or to reach steady state conditions. It will range from one day for under-saturated oil to about ten days for this example, for saturated oil.

So as a consequence one can anticipate rapid equalization of pressures within the reservoir and yet there's communication across wide distances because of high capacity fracture system.

So going to the next white sheet, it shows a little pink colored area which represents a small

tight block. I have a hollow circle there showing that if a well is drained in it we would have a similar situation to the one we just looked at.

The green dot a mile and a half away, the well in good communication with a high capacity fracture system, and what we want to show here is that green well can drain that pink tract better than a well within the tract itself. This is highly significant in understanding this reservoir and applying to govern.

What it means is that uniform spacing is not necessary for efficient production or recovery of reserves from this reservoir.

Q Yes, and how has this geometry evidenced itself in the West Puerto Chiquito as shown in Exhibit A, I mean in the first tab?

A Well, I would suggest we go back and look at Exhibit A briefly.

We have found, for instance, that the down dip wells colored red in the Canada Ojitos Unit have produced oil from up dip and from areas around the blue colored wells that were shut in soon after going on production, and what has happened, is oil has drained from those blue colored wells to the red colored wells, a distance of a mile, two miles, and even further, and has drained it very efficiently.

It also means that when we get to the problem of cross boundary migration, we need not be concerned with uniformly spacing the wells. What we need to be concerned with is protection of correlative rights.

And I would like to point out while we're looking at Exhibit A this time, that we found when the first well was drilled in the Gavilan area, pressures and behavior of that well, production behavior, was such that indicated a high capacity fracture system in the Gavilan area just as we had found in West Puerto Chiquito, and I so testified at the hearing two years ago.

Subsequent to that time additional wells have been drilled with higher capacities than the initial well and have proven that hypothesis.

In addition we pointed out that the -- in Township 26 North, Range 2 West, the Dugan No. 2 Tapacitos Well, although not a well of high capacity, possibly 40 or 50 barrels a day, it too shows the same characteristics of the high capacity fracture system in that area and that it has a flat decline. These wells that produce from the tight blocks surrounded by the high capacity fracture system have production decline rates entirely different from what's found in, for instance, West Lindrith.

In West Lindrith the well comes on production at 100-150 barrels a day, declines rapidly, and

that's because it has only the tight area around it to feed the well.

These wells have high capacity fracture systems, and although, for instance, Dugan's No. 2 Tapacitos has only produced 40 to 50 barrels a day, it does not decline. It just sits there and produces and produces and that's because of the high capacity system around it.

So we knew two years ago that we had the same kind of a high capacity system in the Gavilan area and north of the Gavilan that we found in West Puerto Chiquito.

Now, the wells, the nearest well in West Puerto Chiquito to Gavilan was some five miles away and for various reasons, particularly practicality, instead of enlarging West Puerto Chiquito to include the Gavilan area, we set up a separate pool and on a different spacing and we think the 320-acre spacing in Gavilan is proper; we think 640-acre spacing in West Puerto Chiquito is proper. All we have to do is solve the -- how the -- how to stop cross boundary migration at the common boundary.

Q Now I believe we were up to Tab D.

A Yes, sir.

Q Can you tell us what you have under Tab D?

A We'd like to talk as to this section, we'd like to point out some of the principles of compen-

sating drainage, which apply, and which ordinarily we recognize as wells are spaced and pool rules are provided, and that is that the wells are uniformly spaced. In this instance I've used square proration units, and offset the wells from the center to locate them in a northwest quarter of each proration unit.

The center shaded proration unit, for instance, the well on that proration unit has an equal drainage ability of a circular area around it, everything else being the same. It's closer to its north neighbor than it is the south and it will tend to drain, not only part of its tract, but it will drain the red shaded area from its north neighbor; the blue colored area from its northwest neighbor; the yellow colored area from the west neighbor; and yet each one of those areas in which it drains its neighbor, there's compensating drainage by other -- by other wells uniformly spaced from it.

So this is one way that we can -- can have uniformly spaced wells off-center of the proration unit and still the correlative rights of all parties are protected.

When we go to rectangular units, which are shown on the next overlay, the color scheme becomes a little bit more complicated but we don't need to go to a different color scheme because we can recognize the rectan-

gular spacing units can also be represented by squares and under the overlay you can see the squares with wells marked as "x's", and your squares on the sheet that has "x's" for a well has the same proration unit area as the rectangular proration units on the overlay, and so we realize without having to go to another color scheme, that the area of compensating drainage will apply to wells on rectangular spacing.

Q Go on to the exhibit or the Tab E and explain that to the Examiner.

A Under Section E we would like to take up a simple example of cross boundary migration and how it might be handled.

The gray shaded area represents 40-acre spacing, 16 wells to a section.

The blue shaded area, with the exception of that next to the green common boundary, is on 80-acres, and 8 wells to a section.

Now the protection of correlative rights in such a situation as this is simple if the pools are -- are severely prorated. If proration is such that the wells, for instance, in the gray shaded area had a barrel a day per acre, 40 barrels a day per well, and you had twice that volume for the -- or twice that allowable for the wells in the blue colored area, then you'd have an equal per acre with-

drawal; the protection of correlative rights is upheld; there's no problem of one area beating another one, one on one spacing and one on the other.

The problem we have now is that very few pools are prorated to the point that such as this can be of any help. If the wells are producing capacity, then the wells, the area in which there are more wells drilled will pull the oil from the reservoir faster and there will be a migration from the wide spaced area to the close spaced area.

The calculations I've made show that that can be pretty well mitigated by two rows of wells on the same density spacing pattern, and I've shown that schematically here with the shaded area, that although the blue area generally is on 80 acres, if there are two rows of wells that meet the 40-acre spacing on the west side, they will pretty well stop the -- stop the drainage in both reservoirs.

We have a little more complicated situation in this particular instance in that we have the pressure maintenance project and we have a high capacity fracture system.

But generally this is something that we can look at as a way to help stop cross boundary migration, and that is one of the pool rules that we're asked for, is

that for the west two rows of Sections in West Puerto Chiquito, that we be allowed to drill two wells on a proration unit.

Now we don't want 320-acre spacing there. We just want the right to drill two wells per section if it becomes necessary. We hope that there will be times when we can stop the migration with only one well, which we'll look at in just a moment.

Q Turn going to Exhibit -- or Tab F.

A Under the next, oh, three or four tabs I think we look at some well spacing patterns along a common boundary and how -- how we might solve this problem of cross boundary migration.

To do this I've selected arbitrarily a 3700-foot drainage radius for each well and we don't mean to imply by that that that's the maximum distance or the minimum distance the well will drain; it's just a radius that gives us an idea by which we can draw patterns and show drainage influences and the relative ability of a well, or the opportunity of a well to drain adjoining areas.

The 3700-foot radius as selected is the diagonal of the 640-acre square, and we note here by the red shaded area that there is considerable overlap and that all of the areas overlap with a 3700-foot radius with the exception of maybe a half a proration unit.

Q Going on to Tab G.

A Going on to Tab G we show here the problem of attempting to put wells either equidistant or continue a diagonal pattern, say, from the 320-acre spaced area on the west to 640-spaced area on the east.

The blue shaded area represents the 3700-foot drainage pattern for a Well A as it affects the area east of the boundary, we could for instance come down on a diagonal and locate Well B equidistant from the common boundary as Well A. It's drainage influence pattern is the gray shaded area into the area across the boundary, but the problem here is if the west well, A and C are drilled on 320-acre spacing, then Well C also interferes and produces from the gray shaded area such that Well B cannot freely enjoy that drainage area, and the only way that it can go to try to attempt to continue diagonal spacing or uniform distances between wells, as we cross the boundary for the property on the east side of the boundary, it's absolutely necessary then to drill Well D to get two wells to a section in order to protect from cross boundary migration.

Q Okay, go on to your next tab.

A Under H we show that there's a possiblity that cross boundary migration might be stopped or mitigated to the point that it may not be necessary to drill that second well on the 640-acre proration unit east of the bound-

ary.

If Well B directly offsets Well A for the same distance, those wells have an equal opportunity to produce, they will in a sense cancel each other at the common boundary, the only problem being that the properties east of the boundary have with respect to cross boundary migration is the effect of Well C.

Well C is located a rather large distance from the common boundary and accordingly it will not be -- have such a severe impact, and particularly if Well C would turn out to be not too large a well, then it's possible that we could get by without drilling Well B, and this then would prevent the drilling of unnecessary well, which is one of the purposes of this Division to set regulations avoiding waste, and this is one way do it in this area.

Q You're on th next page now?

A Yes. On the next page, which is the -- has the yellow colored circle and the pink overlay into the east area. It shows the minimal effect that Well C would have and why we say that there's a possibility that we might not have to drill Well D in order to stop the drainage.

Q So the only effect of that Well C would be the area colored in red there.

A Yes, sir.

Q And that would depend on whether -- what

kind of production you had from Well C.

A Right. If the Well C is not a large well, then that becomes rather, perhaps, negligible and we might not have to drill Well D.

Q Okay, go on now to Tab I.

A We have asked, or are asking that any well that's drilled 2310 feet or more from the common boundary that's located in the West Puerto Chiquito Pool and is the only well on a proration unit, that it can have the full proration unit allowable, and we arrive at that as indicated here.

Well B is located 1650 feet from the common boundary. That's the pool rules the way they are now.

It's also possible to drill a well, assuming that the Division approves our application, to drill a second well on the east half of the section and the pool rules there would require that the closest it can be to the quarter section line is 330 feet. That would place it 2970 feet from the common boundary.

The average distance of Wells B and D is shown by the calculation as 2310 feet. So what we're suggesting is that if a well is 2310 feet or more from the common boundary it's the only well in the proration unit, that it be allowed the full allowable.

MR. NUTTER: What do you mean

by full allowable?

A Good question.

Q Are you going to get to that down the line?

A Or right now, if you like.

Q Okay.

A By "full allowable" we're asking that a well on 640 acres in West Puerto Chiquito be given an allowable equal to two, or twice, the 320-acre allowable for Gavilan. That currently is 2 times 702 barrels a day or 1404 barrels a day.

Q Let me, before you turn, let me ask one question. You're not intending to change the locations of the wells as currently authorized by the, or required by the West Puerto Chiquito Pool rules?

A No, sir, we're not suggesting any change in the distances as required the existing Puerto Chiquito Pool rules, which is 1650 feet from an outer section line, 330 feet from a quarter section line.

Q Okay. Go on now to Tab J.

A Tab J is a plat under Case 8714 in which we've requested an unorthodox location in Section 31 of Township 26 North, Range 1 West, to meet the location by Dugan Production Company in Section 36, the Tapacitos No. 4.

The Tapacitos No. 4 is located 1600 feet

from the east line, 1100 feet from the south line of Section 36.

We're asking that our location be 1650 feet from the west line, which meets the requirements of the regulations now, the rules now.

Q You're giving them 50 feet there?

A Yeah, we're giving them 50 feet there. But 900 feet from the south line and the reason for that is topography, which we can look at the green colored sheet, the next sheet, which shows our problem in attempting to go from 1650 feet from the south line.

So the reason for this application for unorthodox location is the topography, which prevents us from meeting the Tapacitos No. 4 at a normal distance of 1650 feet.

Q Okay. Go on to Tab K.

A Tab K is the -- for Case 8695, another unorthodox location. In this instance we have no topography problem; we want to meet the Mallon No. 1-8 Howard, which is located in the northeast quarter of Section 1 of 25 North, Range 2 West, by about the same distance from the common boundary, namely 870 feet, and we're asking that it be 1850 feet from the north line. We couldn't get 1650 because of an existing road.

Q Okay. Why is it necessary to offset the

Mallon Well at 870 feet from the boundary of the West Puerto Chiquito Pool?

A That's the only way that we can stop cross boundary migration is to meet it at the same distance. We do not have the protection of compensating drainage that would apply if the areas were on 320 acres.

Q So it's your testimony that it's got to be at or near 870 feet in order to adequately protect your correlative rights?

A Yes, sir.

Q Let's go to Tab L.

A Under L we'd just like to summarize briefly what our application is.

Number one, we're asking that the allowable for each 640-acre proration unit within the West Puerto Chiquito Mancos Pool be set at twice the allowable of that for the Gavilan Mancos Oil Pool, which would be 2 times 702, or 1404 barrels a day.

Number two, that two wells may be drilled on a 640-acre proration unit in the West Puerto Chiquito Mancos Pool if such proration unit is located in the west two rows of sections in the pool.

Number three, that only one well shall be allowed in the west one-half of a proration unit in the West Puerto Chiquito Mancos Pool if such prorationunit is located

in the westernmost row of sections in the pool, and this is to meet the same requirement that exists in the Gavilan Pool at the present time.

Number four, that any well in the West Puerto Chiquito Mancos Pool which is located closer than 2310 feet from the east boundary of the Gavilan Mancos Pool shall not be allowed to produce its share of its proration unit's top allowable in excess of the top allowable, 702 barrels a day, for a well in the Gavilan Mancos Oil Pool.

And then number five, that any well in the West Puerto Chiquito Mancos Pool which is the only well on a 640-acre proration unit and which is located more than 2310 feet from the east boundary of the Gavilan Mancos Oil Pool be allowed to produce a full 640-acre proration unit top allowable, 1404 barrels a day.

And then the pink sheet is a summary in Case Number 8714, the unorthodox location is to meet an offset which lies west of the north/south boundary between West Puerto Chiquito Mancos Oil Pool and proposed extension to the Gavilan Mancos Pool, and which boundary also is the west boundary of the Canada Ojitos Unit.

The offset location, Dugan Tapacitos No. 4, is 1100 feet from the south line and 1600 feet from the east line of Section 36, Township 26 North, Range 2 West.

Our requested unorthodox location is lo-

cated 900 feet from the south line and 1650 from the west line of Section 31, Township 26 North, Range 1 West.

There the location is unorthodox because it lies closer thn 1650 feet from the south section line of Section 31. We believe the well cannot practicably be located farther from the south line because of terrain.

Then the summary for Case Number 8695 is on the buff colored sheet.

Q That's basically the same as it would be for the pink colored sheet, isn't it?

A Except that the reason for the unorthodox location here is to place a protection wsell within the Canada Ojitos Unit equidistant from the outside offsetting well in order to protect the unit's correlative rights.

Q There's no other way to protect your correlative rights other than to move directly offset to the wells in the west.

A The only other way would be to force us to drill two wells on a section, which would be -- would constitute waste and we think therefore is improper.

Q What would happen if you continued drilling wells at a rapid pace along the common boundary of both pools?

A Well, we'd hope for one thing that the Division will approve the extension of Gavilan to the north

and so that the pool rules which now apply to Gavilan will apply to the area to the north, and then our policy has been to wait until the offset well is drilled so that we can then meet it by the manner in which we've described here.

If we drill first and then they drill some other kind of pattern, then we may wind up in the situation which we just discussed, that we would be forced to drill two wells on the west row of sections, and of course, we may have to in time, but at least by meeting the wells equidistant there's a possibility that we can save the drilling of unnecessary wells.

Q Would drilling of unnecessary wells have a tendency to damage the pressure maintenance system you currently conduct on the Canada Ojitos Unit?

A Yeah, there's no question that the higher the rate of production, since gravity drainage is a rate-sensitive mechanism, that if we exceed that rate that we then take -- we risk losing part of the otherwise recoverable oil.

So the fewer wells in that respect, the better, and of course, we have a very delicate balancing act. We need to produce at a low rate within the unit to augment the gravity drainage process. We need to produce at a high enough rate on the boundary to avoid the cross boundary migration.

So it's not a simple problem but one of the steps in a solution is what we're trying for here today.

Q In your opinion would your proposal here today solve the problem along the common boundaries before it gets any worse?

A Oh, yes. Yes, sir, it's unfortunate, of course, that Gavilan was not extended to the north before Mallon drilled their -- their well. Then that well would have been 1650 feet from the west line and the wells then would have been 3300 feet apart and average distance of wells on 320-acre spacing is about 3700 feet, which would have been nice to have had it that way; however, there's no real, real damage done as long as we can meet the offsetting distance.

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

A No, sir.

MR. PADILLA: Mr. Examiner, we tender Exhibit One in Cases 8715, 8714, and 8695.

MR. STOGNER: Exhibit One for these cases and all its sub-parts will be admitted into evidence.

At this time we'll take about a five minute recess.

dence.

At this time we'll take about a five minute recess.

(Thereupon a recess was taken.)

MR. STOGNER: The hearing will resume its order.

We are ready for cross examination. Mr. Carr, do you have any questions?

MR. CARR: I have no questions.

MR. STOGNER: Mr. Chavez?

MR. CHAVEZ: Yes.

QUESTIONS BY MR. CHAVEZ:

Q Mr. Greer, did you address the -- or intend to address the offset drainage problem in hearing that created the Gavilan Mancos Pool when you requested that only one well be allowed to be drilled in the east portion of those sections that border the West Puerto Chiquito Mancos Field?

A Yes, sir. That's what we had in mind at the hearing two years ago was to prepare for this cross boundary migration problem, and we intended to meet it exactly as we have proposed here today.

Q So you feel that actually that -- that rule was just preliminary and wasn't adequate in itself to protect you from offset drainage?

A Oh, no, sir, there -- there are a number of other things that come about if we don't do something now.

For instance, we feel that on 640-acre spacing that a proper allowablea is twice that allowed for a 320-acre well and I just don't see how there could be any argument with that. Perhaps there is, but I don't see how there could be. I don't see how the Division could -- could permit a 320-acre well to have a 702-barrel a day allowable and not permit a 640-acre spaced well to have twice that allowable, and if that's the case, the existing rules, then, would allow the 640-acre spaced area to drill a well 1650 feet from the common boundary and have an allowable then which is twice that of the Gavilan well that's 1650 feet from it, and so we're suggesting that those wells be 1650 feet apart and they each have 1702 barrel a day allowable where there's one well in the west half of West Puerto Chiquito and one well in the east half of Gavilan, and then we'd have equidistant wells and equal allowables. We still take care of the problem but if need be, then a second well can be drilled on the west row of sections, west two rows of sections in West Puerto Chiquito, if it's necessary to go

beyond that first step to protect from cross boundary migration.

The only reason, Mr. Chavez, that we didn't go into this at the hearing two years ago, and I think you probably will remember, but it was long enough as it was.

Q Do you intend to meet each well drilled along the east half of those sections in the West Puerto Chiquito Mancos Pool with another well in the west half of the west half of the (inaudible)?

A Yes, sir, that's our -- that's our plan, and we felt that it was best for the Gavilan well to be drilled first and then we could just exactly meet it and help solve this problem.

Q You've indicated that you felt the Dugan Tapacitos No. 2 Well had flat decline due to producing from a fractured reservoir.

A Yes, sir.

Q Could there be other reasons for the flatter decline, say, formation damage, skin effect, or production problems mechanically with the well that would not allow it to produce at a higher rate?

A I think there's no question that there can be things that would not allow it to produce at a higher rate, but if its basic reservoir was the same, for instance,

as West Lindrith, then the effect of that decline in reservoir capacity as wells produce would affect its restricted production.

So say that it's -- if there were no mechanical problems, if there were nothing restricting it to production, then, say, that it would have a normal -- under normal completion let's just say it might have had 100-barrel a day capacity rather than, say, 40, then when it would have declined normally from 100 barrels to 90 barrels, then it would have declined from 40 barrels to 35 barrels with the mechanical problem, and so having mechanical problems would not, I think, substantially have affected that analysis.

Q Mr. Greer, on your Exhibit One, let me find the section here -- the section G.

A G like George?

Q Yes, if you would look at that, please.

Now, you had said earlier that you felt 320-acre spacing was appropriate for the Gavilan Mancos Pool.

A Yes.

Q Yet you're showing a drainage radius for a well in the Gavilan Mancos that far exceeds 320 acres, is there a reason for that?

A Oh, yes. Yes, sir. The 3700-foot radius

that I chose is just an arbitrary radius to show comparative drainage influence patterns, but the Gavilan wells undoubtedly have capacities to drain far in excess of that; 3700 feet in a circular drainage area is something like 1000 acres, and I'm sure some of the Gavilan wells have abilities to drain 2-or-3000 acres; no doubt they're doing it right now.

Q Did you prepare any calculations you might give us even at a later date that would indicate that?

A Well, we just compared it with West Puerto Chiquito and we've put on in previous cases, and in order not to unduly burden this case we've not repeated them here.

But we've shown where in West Puerto Chiquito wells have drained without doubt several thousand acres, and you have similar reservoir characteristics, similar electric log, lithology as indicated by the electric logs. They're just the same -- the same kind of thing.

Q Mr. Greer, in that area of Township 25 North and 26 North, 1 and 2 West, it appears that there's going to be four wells within what would be a square mile, if we counted the wells that you want exceptions for in 8714 and 8695, and the Dugan Production Tapacitos No. 4 and the Mallon well.

A Yes, sir.

Q Would you think that that is sufficient

spacing --

A Well --

Q -- your testimony of the high radius of drainage areas the wells have seemed to drain?

A Absolutely not. In fact, I think I wrote Mr. Mallon about a month ago in August pointing out that there would be a number of unnecessary wells drilled in that area. I believe at that time I indicated three to five; there may be more than that.

The -- undoubtedly right now the No. 1-A Howard could produce efficiently the reservoir that's going to be produced by some six or eight wells.

So those, those wells are unnecessary from a standpoint of efficient production from the reservoir; no question about that.

The problem is how do you avoid drilling those wells? Now we've made an approach here to -- to let everybody protect their correlative rights, give them an opportunity to protect their correlative rights with a minimum number of wells, but where there are competitive operations there's just no way to avoid the drilling of unnecessary wells and still protect correlative rights, outside of unitization.

Of course the area could be unitized to avoid the drilling of these unnecessary wells. I wrote to

Mr. Mallon and suggested that we consider unitizing. It didn't appeal to Mr. Mallon.

I talked to Tom Dugan, asked him if he would like to consider untizing to avoid drilling unnecessary wells, and it did not appeal to Mr. Dugan, and we didn't pursue it any further.

That's the only way that those unnecessary wells could be -- the drilling of them could be avoided.

Q Mr. Greer, if the Mallon well had been located, say, for example, 1650 from the north and 1650 from the east, would that have precluded the drilling of these three other wells that are being (not understood)?

A No, sir, all it would have done was had the wells a little farther apart and we wouldn't have had to have an unorthodox location hearing.

Q You would still -- you would still feel that there would be four wells necessary to protect the correlative rights.

A I think, no question Dugan has got to drill a well to the north of Mallon. We have to drill our well equidistant from Mallon's because of the difference in spacing in the unitized property.

I think there would be no way that we could avoid drilling those wells outside of unitization.

Q So it would still have four wells within one square mile area regardless of the distance that Mr. Mallon's well is located from the --

A Oh, yeah, and of course, that's just the way the cookie crumbles. To avoid anything like that, you have to select not only the spacing but the pattern, and the spacing has to be uniform.

Q Mr. Greer, you'd said that it was unnecessary -- if I get the wording wrong, correct me, that the wells be specifically within certain location to drain efficiently. I'm doubtful fo the wording there, but in order to effectively drain the reservoir.

A I don't recall saying anything like that.

Q It's not exactly the way you said it. Just give me a second and I can find my notes here.

Wouldn't it --

A Excuse me. Excuse me, sir. Uniform spacing is not necessary for the efficient production of the reservoir, or efficient recovery of oil from the reservoir, and so that leaves, then, the location of wells only to deal with protection of correlative rights.

MR. CHAVEZ: I have no further questions.

MR. STOGNER: Are there any other questions? Mr. Carr?

MR. CARR: Mr. Stogner, just to clarify one thing.

CROSS EXAMINATION

BY MR. CARR:

Q Mr. Greer, I just want to be sure I didn't misunderstand you.

You did not state that Mr. Mallon recommended unitization.

A No.

Q He is, in fact, opposed to that.

A Right. I said that I had suggested that in order to save on the drilling of wells that we might consider unitization. Mr. Mallon was not responsive to it. Mr. Dugan was not responsive to it. We dropped it.

Q Thank you. That's all.

QUESTIONS BY MR. CHAVEZ:

Q Mr. Greer, you'd asked the Division to take administrative notice of previous hearings and orders concerning the West Puerto Chiquito Mancos Pool.

In the special pool rules for the West Puerto Chiquito Mancos Pool which you requested you've required that the pool rules only apply to the boundaries of the pool and not apply to any well drilled within one mile

of the pool boundary as is generally under the -- is required in the general rules and regulations.

At that time did you feel that you had defined the limits of the West Puerto Chiquito Mancos Pool?

A No. No, but what we had in mind there is the situation which we're discussing here today and that is that at the boundary of the unit it's a simple matter to change the spacing and still protect everyone's correlative rights.

It's a more difficult problem to change spacing if the wide-spaced area is not unitized; very difficult.

You see, we can drill, as we have suggested, one row of sections at two wells to a section; maybe both rows, two wells to a section; maybe some sections we'll have one well, some sections two wells, but the interests within the unit are equalized and so everyone's share of the production from any well is the same, and so it makes no difference where the oil comes from, each party gets his share of the oil, and that's not true if you're not unitized.

And so that's what we had in mind some twenty years ago when we asked that the -- that the pool boundary, or that the one mile provision not apply to West Puerto Chiquito, because we visualized at that time that the

unit boundary would in time be the pool boun
could need a change in spacing, and we knew,
there would be a change in spacing because the ne
at that time, some twenty miles west of us, were o
160-acre spacing, and some of them, as you k
eighties, and so we knew that at some point there woul
time -- because we felt like at that time that the a
would in time be drilled, and that we would have this prob-
lem of needing a spacing change, and it's a simple matter at
a unit boundary; it's difficult otherwise.

Q Mr. Greer, as concerns the wells that --
the four wells within the one section there at the intersec-
tion of the townships (not clearly understood), only one of
those wells is drilled at this time, is that right, the Mal-
lon well?

A I believe, yeah, of those four. I think
Mallon is drilling another well in the southwest of 1.

Q Could the Division enter an order requir-
ing the location of the wells within the drill tracts, say,
on a northeast/southwest or opposite quarter type situation
in the Gavilan Mancos Pool that would be more protection of
the correlative rights and more efficient for recovery of
the oil from the pool?

A Well, first as to efficient recovery, as
I've indicated before, uniform spacing is not required be-

cause of the fractured block system for the efficient recovery of oil from the reservoir. So that, that's not necessary.

Now, if you want the wells uniformly spaced, then you can do that within a pool, as for instance, within Gavilan that's on 320-acres, and you can designate northeast/southwest, or whatever. To be equitable and fair it should have been done when the pool was first set up, first established.

To cross a boundary from 320-acre to 640-acre spacing and try to require equidistant or diagonal spacing, for the reason that I have shown in our testimony today, could cause waste by requiring us to drill an additional well in the 640-acre spaced area on a 640-acre unit.

MR. CHAVEZ: That's all I have.

MR. STOGNER: Any other questions?

MR. NUTTER: Mr. Stogner, I'd like to ask a couple for clarification.

MR. STOGNER: Okay, Mr. Nutter.

QUESTIONS BY MR. NUTTER:

Q Mr. Greer, with respect to your Exhibit Number -- the plat.

A Yes, sir.

Q Up here in Sections 1, 6, 31, and 36, I think you stated the only one of those four wells that has been drilled is actually the Mallon well.

A Yes, sir.

Q And that's rather close to the boundary of the Ojitos Unit.

A Yes, sir.

Q But presumably that was drilled in that manner because it was outside the Gavilan area and not subject to the Gavilan special rules.

A Yes, sir.

Q What is the distance of that well from the line?

A 870 feet.

Q 870. Now what is that location immediately west of that well? You've got a circle there.

A Immediately -- oh, I think that's a -- well, I don't know whether it's a mistake or perhaps an abandoned location, but I don't -- I believe that Mallon does not propose to drill that location. He's here --

MR. MALLON: It's abandoned. It's an abandoned location.

A Abandoned.

MR. MALLON: It should be off the record.

Q And then Mallon is drilling the southwest quarter of Section 1.

A Yes.

MR. MALLON: Yes.

Q Now the Dugan Tapacitos No. 4 is still a location?

A Yes, sir.

Q And you're going to offset it equidistant from your line as it is from your line.

Okay. Now, with respect to your cross section, Mr. Greer, you have those two red dots.

A Yes, sir.

Q And the other one I think you said corresponded to a frac zone in a well that had produced a million plus barrels?

A Yes, sir.

Q And what well was that?

A That's Canada Ojitos Unit L-27.

Q Ojitos L-27.

A Township 26 North, Range 1 West, Section 27.

Q Okay, and then the lower red dot corresponded to the perforated interval in A-16 there on that exhibit and you said that that zone had produced six or seven million barrels --

A Yes, in --

Q -- from several wells?

A Yes, sir, in Township 25 North, Range 1 West. That's the zone, and the only zone in most of the recovery wells that's been produced.

Q So that six or seven million barrels wasn't from a single well. It's from a group of wells --

A Right.

Q -- in that township.

A But that zone only.

Q Okay. Now, on these allowables, Mr. Greer, on your insert I, Tab I, now you've calculated the distance for a well to receive the maximum double allowable as being at least 2310, location number E, is that correct?

A Well --

Q A well has to be at least 2310.

A Yeah, for a double Gavilan allowable or a normal West Puerto Chiquito allowable.

Q It will have to be at least 2310, and you calculated that 2310 by averaging a 1650 plus a 2970.

A Right.

Q Well now, if you you look at the distance that is required for two wells in the Gavilan Pool, now in the east half of the section in the Gavilan a well has to be at least 1650, correct?

A Right.

Q Now in the west half a well has to be at least 790 from the outer boundary, so the closest it could be to the Ojitos Canada Unit would be 2640 for the east half plus 790, which would give a total of 3430, and then if you averaged that in with the 1650 that the other well has to be distant from Canada Ojitos, you have 5080, or an average distance of 2540.

Why would you have an advantage of a double allowable for a well that's only 2310 when the other operators to the west of you would have to be an average of 2540?

A First, it's not a double allowable. It's a single allowable.

Q Well, it's a double -- you're getting a -- you're allowed two -- you're getting the same allowable those two wells would be getting --

A Right.

Q -- as a maximum.

A Right.

Q For a single well.

A Right.

Q So it's a double allowable. You're drilling one well and getting twice the allowable, aren't you?

A Well, we drill on 640 acres so it's just a normal allowable for 640-acre allowable.

Q You've got 640-acre spacing allowables in here with 640 barrels per day.

A Oh, well, we're assuming that, as I indicated earlier, I just don't see how this Division can deny a 640-acre spacing an allowable twice that that they give a 320-acre well.

Q Yeah.

A Perhaps they can, but I --

Q Well, they had -- they had a different depth factor, apparently, than your pool had.

A Well, but when we get to the boundary, the wells that are just about the same depth.

Q Sometimes the discovery well determines the allowable for the whole pool, and the discovery allowable was a little shallower than down here on the west flank.

A Right, I understand that, but the issue right now is the boundary, the boundary issue, and --

Q Okay, well, I won't call it a double allowable, even though it's two times the allowable that the single wells to the west are getting, but why would they have to be an average of 2500 foot and you only have to be 2310?

A Well, in the first instance, I was not going to suggest that we change the existing pool rules for West Puerto Chiquito.

Q Well, why wouldn't your well have to be at least 2500 foot?

A Well, it's another philosophy to look at it. In the first place, I feel like you're a little bit concerned about something that's not going to happen. There's not going to be very many wells produce 1400 barrels a day, and even if they do, they're not going to produce them very long, so in the end I sure don't believe that -- that you're going to be adversely affected.

Not only that, terrain is a real problem in both sides of this boundary and the odds are that -- that the wells will not be located exactly according to the rules, anyway.

Q Well, I'd suggest that if a well on the east side of the boundary were going to be entitled to the same -- a single well were going to be entitled to the same allowable as two wells on the west side of the boundary would be entitled to, that it ought to be the same distance as those two wells have to average.

A Let me offer a better suggestion, and that is that the wells in Gavilan have the same minimum distance from a quarter section line as -- as West Puerto Chi-

quito, which is 330 feet.

Q They do have.

A Well, if that's all, then they can be drilled the same distance.

Q No, they have to be 790 from the outer boundary of the unit, though, and not closer than 330 to an inner boundary.

A Well, if they're 330 from an inner boundary then they'd have exactly the same thing that we have here.

Q Well, but, you see, the well in the west half has to be the entire east half away from the Canada Ojitos, which is 2640 feet.

Then it has to be 790 feet from the east side of that west half.

A That's what I'm --

Q So 2640 plus 790 --

A That's what I'm suggesting, all you need to do is change that 790 to 330 and then you've got the same thing you have in West Puerto Chiquito.

Q Well, that would -- that would be to the outer boundary of the unit and I don't think some operators would stand for the wells to be 330 to the outer boundary of the unit.

A Nope, what I'm -- I'm not saying 330 from

the outer boundary. I'm saying 330 from a quarter section line.

Q Well, it is 330 from a quarter section line.

A Well, if you're 330 from a quarter section line, that's all that this is and you're the same distance as West Puerto Chiquito.

Q The Gavilan rules require that a well shall be located no nearer than 790 to the outer boundary of a spacing or proration unit, nor nearer than 330 feet to the governmental quarter quarter section.

So they have to be a minimum of 3430 feet from the Canada -- the west well would have to be a minimum of 3430 feet from the Canada Ojitos Unit.

A Then I suggest you relax those rules. They probably need that flexibility anyway.

Q Well, I don't know if they would stand for 320-acre wells to be drilled closer than 790 to the outer boundary, though, and that's what you'd have to do, would be you'd have to relax that 790 to the outer boundary.

It would seem more proper to require your well to be at least 2500 feet from the western boundary of the Canada Ojitos to qualify for the double allowable.

A Okay, why don't we pursue it just a little bit further?

The average distance is just a way to arrive at what might be something equitable.

A Right.

Q I've also calculated the areas here. The area of the two wells which would be allowed, the B and D, the combined areas of those two wells west of the boundary is 283 acres.

The, using the same radius, the area for Well E is only 134 acres and if you multiply it by 2 it's 268 acres, so, really, the drainage influence is considerably less, and I don't know whether that would -- that proportion would bring you down from 2500 to 2310, but it appears to me that's not really that significant.

Q Well, I would suggest there that even though B and D do protrude into the Gavilan Pool with more of a drainage intrusion than Well No. E does, there's more likelihood of B and D coming closer to making 1400 barrels a day than E alone.

A Right, and so you're protected, you're protected from that standpoint.

Q Well, no, you'd have more drainage into the Gavilan area.

A With Wells B and D, right.

Q With the two wells.

A Right. I think that's right, and so

really, you're not being hurt by letting E have a full allowable.

Q Okay.

MR. NUTTER: I believe that's all.

MR. STOGNER: Mr. Buettner, I'm sorry, I thought you were just going to make a closing statement or I would have called on you earlier.

MR. BUETTNER: Yes, well, I did not plan to ask any questions, but a couple of things Mr. Greer mentioned here raised a couple of things.

I will try to be brief.

CROSS EXAMINATION

BY MR. BUETTNER:

Q Mr. Greer, calling your attention to your Tab B, the cross section, just two quick questions.

The first is, I notice that these four well logs depicted on this drawing are roughly, are spaced roughly a similar distance apart, but I note that in fact the Amoco Jicarilla Apache Well, for example, is actually, according to the caption, two townships away from the Northwest Exploration Gavilan Well, is that correct?

A That's correct.

Q Okay, and similarly the Standard Oil of

Texas well is at least a township, or so, away from the BMG well.

A Right.

Q Okay, so I just wanted to make sure that there's no misunderstanding and the two wells which you identified as being similar are in fact very close together and the two wells which you identified as being dissimilar are in fact a great distance away from those two wells.

A Oh, yes, but they -- however, I might point out that they're no farther away than other wells within the West Puerto Chiquito Pool that have similar characteristics on a north/south direction.

Q Running north to south but not east to west.

A Right.

Excuse me, since you brought that up, I probably should point out that we've shown on our Exhibit A by a brown coloring the -- what we consider oil saturated area, and of pretty much similar characteristics.

We have earlier postulated that that reservoir would end somewhere down in Township 24 North, where you have the jagged lines here, the jagged area of the -- of the brown coloring.

How far west it goes, how far northwest it goes, we don't know; we haven't tried to study it, but

there's a very good possibility it extends considerably farther west than just Gavilan and I just merely point that out, but I think the Commission should take that into consideration and revise their policy, if it is a policy, about spacing in this area.

Q You are talking about -- about oil saturated. You're not necessarily talking about producable reservoir.

A Well, we're talking about reservoir that has similar lithologic characteristics, wells which so far have had the same producing characteristics, indicating a fracture system, and my feeling is that wells in that general area west of Gavilan, northwest of Gavilan, the spacing should be perhaps 320 acres initially and then if they find that they need to go to a closer spacing do it later rather than first.

Q Continuing on, calling your attention within your Tab B to the Northwest Exploration Company well, now, that's -- obviously that's a Northwest well, that's not a well that you drilled.

A Oh, right.

Q And the two red dots, I believe you said indicate lost circulation zones, is that right?

A Yes, sir.

Q And clarify for me, lost circulation,

that means that the drilling fluid suddenly went away, rushed away from the wellbore and into, presumably, some kind of a void space underground.

A Right.

Q And are those kinds of problems encountered in -- in other reservoirs than the fractured reservoirs?

A Right, you're more apt to have lost circulation in fractured systems and porosity.

For instance, if you're dealing with -- if we are dealing with a sand, we made, in the hearing two years ago, we had exhibits showing the difference of what happens with the mud when it's plastered up against a sand face as compared to a fracture system, and the odds are, if you lose circulation in this area, it's not a bit change -- it was not at a bit change, then the chances are that you're dealing with fractures.

Q Uh-huh. That's based on -- that's based on your experience in the Canada Ojitos Unit.

A I think it's based on experience of operators in Gavilan, as well.

Q But it is true that, for example, in carbonates, where you have large voids or vugs, you can lose circulation.

A Yes, sir, but we don't have carbonates in

this area.

Q Uh-huh, and a change from a very nonporous medium to a real porous medium, like a very friable sandstone, you could lose circulation also? That's within the hypothetical.

A Yeah, perhaps friable; we've never found any friable sands in this formation.

Q Okay. Just wanted to establish whether it was your testimony that the lose of circulation was an absolute indicator of fractures.

A It may not be absolute; I'd say, maybe, 99.9 percent in this area.

Q That's your -- that's your opinion.

A Yes, sir, that's my opinion.

Q Thank you.

MR. BUETTNER: We don't have anything further for Mr. Greer.

MR. STOGNER: Any other questions of this witness?

CROSS EXAMINATION

BY MR. STOGNER:

Q I need to get some clarification, Mr. Greer.

A Okay.

Q You're asking that two wells be drilled in the 640-acre proration unit in West Puerto Chiquito Mancos if such proration unit is located in the west two rows of the section in the pool.

Are you talking about the two sections running from the far south end to the far north end or just that portion that is adjacent to the Gavilan Mancos Pool and what about extensions to the area, and if we say that, then would that be four sections if we included this new proposed extension that is being proposed by Dugan in Case Number 8713?

I need some clarfication on what two rows need to be -- have this buffer zone.

A Well, for simplicity and practicality, I suggest you just run the length of the -- of the pool, and then if Gavilan is extended all the way up, why, then we're already prepared for it.

Q Okay.

MR. NUTTER: However, wouldn't that give the wells an extremely high allowable as opposed to statewide allowables on the north end, or anywhere where it's not in the Gavilan Pool?

MR. STOGNER: Are you asking that as a cross examination question, Mr. Nutter, or --

MR. NUTTER: I was just kind of

wondering out loud.

MR. TAYLOR: Just kind of popped out, huh?

MR. NUTTER: Yes, it raised a question in my mind.

MR. STOGNER: Thank you, Mr. Nutter.

MR. NUTTER: Mr. Stogner, did you say two rows of sections?

MR. STOGNER: I guess I did. That's what --

MR. NUTTER: Is that the application, for two rows?

MR. STOGNER: The application is for a buffer zone.

MR. NUTTER: How wide is the buffer zone?

MR. STOGNER: That's what we're establishing today.

MR. NUTTER: Is it two rows of sections or one row of sections?

A We're asking for two rows of sections, the right to drill the second well on a proration unit.

MR. NUTTER: I see.

MR. STOGNER: Let me clarify

that. The application that came in asked for two sections.

The advertisement that went out just said buffer zone --

MR. NUTTER: Yeah.

MR. STOGNER: -- and it did not, yeah, specify that in that particular advertisement that did go out.

The advertisement I wrote did specify it; the advertisement that went out did not specify it.

MR. NUTTER: Would two rows of sections get 1440 barrels if they had -- each, if they each had one well on them?

A We're asking that any, any well in West Puerto Chiquito that's only one well on a proration unit have 1404 barrel a day allowables.

Q So you're asking essentially, to clarify that, it's clear in my mind, but evidently it's not, that for the whole pool you want to change --

A The allowable.

Q -- the allowable, right?

A Yes, sir. If the Gavilan is allowed 320 barrels on 320 acres, 700 barrels a day, we want 1400 on the 640.

MR. NUTTER: For the entire

West Puerto Chiquito Pool.

A Sure.

MR. NUTTER: That's not applicable just to the -- that's not applicable just to this buffer zone we're talking about today.

A No, sir. No, sir.

MR. NUTTER: So you want a change in the pool rules for that portion of it.

A Yes, sir.

MR. NUTTER: To change the allowable.

MR. STOGNER: Mr. Nutter, that was very clear in the advertisement; further that the oil allowable assigned to the proration units poolwide, as promulgated by Rule 5 of said Order No. R-6469 be amended and that the allowable both be based on so on and so on and so on.

Anyway, if I may, let's leave that for a second. I'm sure there'll be a lot of questions after this on that particular aspect.

Q If, Mr. Greer, if the West Puerto Chiquito Mancos Pool is extended west any further, and I'm going to use this proposed extension, if we will, what happens --

Q Excuse me, did you say West Puerto Chi-

quito extended or are you talking about extending Gavilan north?

MR. STOGNER: Let's go off the record for a little bit and everybody catch a breather.

(Thereupon a discussion was had off the record.)

MR. STOGNER: During the time we were off the record, I was clarified on my misleadng statement, so I would like to clarify the buffer zone that we're discussing, or that was advertised and that's on the docket today, and as I understand it, quote, buffer zone be a row of two sections on the west boundary of the Puerto Chiquito as it stands.

A That's fine with us. I'm not sure just how that squares with the -- either the advertisement or our official application. I think our official application we just say the westernmost two rows of sections in the unit, and if that -- we can take it either way.

Q Well, that's how I'm asking you now, how would you like it? On the unit, that's fine.

A On the advice of counsel, he thinks we should stick with the -- his -- his official application.

So we -- let's stay with just within the unit, then.

Q Okay.

MR. NUTTER: Is the pool different on the west side from the unit boundary?

A It's --

Q Okay, let me further clarify this. The way I see on exhibit number -- I mean part A of your Exhibit Number One, essentially the north end of your Canada Unit is in Township 26 North, Range 1 West, is that right?

A The north boundary of 26 North, yes, sir.

Q Okay, and your southern boundary of that -- of this unit on the west side would be Sections 7 and 8 in Township 24 North, Range 1 West.

A Yes, sir.

Q Okay, so that is, when we talk buffer zone in the ad and in the docket, this is the zone that we're talking about.

A Yes, sir.

Q We're clear on that.

Now your application that you sent in, I believe did clarify this area that we're discussing right now.

A Yes, sir, it coincides. It confirms that or is the same as that.

MR. STOGNER: For a little bit semblance of order, let's now call for a few more cross

examination questions.

Mr. Carr, do you have any questions?

MR. CARR: No further questions.

MR. STOGNER: Mr. Buettner?

MR. BUETTNER: Nothing further.

MR. STOGNER: Mr. Chavez? Mr. Nutter? Any questions?

MR. NUTTER: I'm not even wondering out loud now.

MR. STOGNER: Thank you. Is there any further questions of Mr. Greer?

MR. PADILLA: I don't have any further questions, Mr. Examiner, and I believe I tendered Exhibit Number One. If I didn't, I ask that it be --

MR. STOGNER: Yes, you did.

There being no further questions of Mr. Greer, he may step down.

Before I ask for closing statements, Mr. Padilla, would you please provide me with a rough draft order?

MR. PADILLA: Yes, sir.

MR. STOGNER: Mr. Buettner, I'll let you go first. Mr. Carr, I'll let you have a clos-

ing statement second, and Mr. Padilla, if you have anything at the end, you may.

MR. BUETTNER: Thank you.

Koch is the owner of a 3.66 percent interest in the West Puerto Chiquito Mancos Unit. That is the working interest which we own in that pool, as well as an owner of a substantial acreage position in the new wells which Mr. Mallon's company has drilled in the area north of the existing Gavilan Pool, and therefore we are -- have a unique perspective in this case because we are on both sides of this line, we are owners.

We'd like first to say that Mr. Greer has for years conducted a conservation-minded project in the West Puerto Chiquito and what he's accomplished has been well explained to this Commission and to everyone over the years.

We also feel that Mr. Mallon should be commended because the combination of acumen and guts that his company showed in drilling these wells, which have revitalized the area north of the Gavilan Pool, are just the sort of activity that the State of New Mexico should encourage in the development and conservation of its resources.

Koch recognizes the necessity of establishing an orderly program of development for the

new area and one which will both allow the unit operations an opportunity to continue and the non-unit explorers to the west to be compensated for the risk that they've taken.

We agree that Mr. Greer's proposed locations and his proposed spacing rules will protect the rights of Mr. Greer, and the unit owners, as those -- as that proposal is expressed on Greer's Tab L of his exhibit.

This is conditioned, however, on the proposition that 320-acre spacing and a corresponding 702 barrels of oil per day top allowable is timely established for the North Gavilan area to allow those explorers to be compensated for their risks.

We would only add that we understood that the -- that Mr. Greer's 2310-foot setback, which has been discussed here, would be countered by an equidistant setback for similar wells in the Gavilan Pool and we do feel that that is important.

We are simply saying today that if the relief which the North Gavilan area requires, and which has been requested in the Dugan cause which was earlier today continued to October 9th, is denied or is not granted timely, then Koch might be compelled to file an appeal in these causes to protect the rights of the explorers in the North Gavilan area, and that is our only statement at this time.

MR. STOGNER: Thank you, Mr. Buettner.

Mr. Carr?

MR. CARR: Mr. Stogner, we've heard from Mr. Greer, who operates the unit and proposes these rules. We've heard from Koch who has acreage within and without the unit; they support the rules.

Mallon Oil Company has acreage only outside the Canada Ojitos Unit. We have acreage in the area which is within the proposed northern extension of the Gavilan Mancos Pool, but we also support the rules that are proposed by Mr. Greer.

We also support his applications for unorthodox well locations, and the only thing we would request is that the effective date of the new rules coincide with what we believe will be an extension of the pool rules for the Gavilan Mancos Pool, and that way everything will go into effect at the same time.

We'll be back before you on the -- before Mr. Quintana on the 9th to propose the extension of the pool to the west.

MR. STOGNER: Mr. Padilla?

MR. PADILLA: Mr. Examiner, based upon the very kind closing arguments of counsel, I basically would only urge that speedy approval of the exten-

sion of the Gavilan Mancos Pool be entertained once that hearing is held.

We do have some problems in that we request a speedy resolution of this case, also, because of drilling commitments on outside locations prior to the time -- basically based on whether problems are going to occur on whether those wells are not drilled soon.

In addition to that we may have some problems in adjusting the allowables if those offset wells are drilled as -- and approved as we applied for. Some kind of adjustment would be necessary on the allowable question, but I don't think that that would be a serious matter and I don't -- I think we could make that adjustment so that we won't get an argument over an extension of the -- with the allowables on the Gavilan Pool that Mallon has drilled.

That's all I would ask.

MR. STOGNER: Thank you, Mr. Padilla.

Does anybody have anything further in Cases 8695, 8714, and 8715 at this time?

There being none, these cases will be taken 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

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 8695, 8714, and 8715 heard by me on 25 Sept. 1985.

Michael E. Stogner, Examiner
Oil Conservation Division