STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING)
CALLED BY THE OIL CONSERVATION)
DIVISION FOR THE PURPOSE OF)
CONSIDERING:) CASE NO. 10847

APPLICATION OF MITCHELL ENERGY CORPORATION

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: David R. Catanach, Hearing Examiner

October 7, 1993

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on October 7, 1993, at Morgan Hall, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Deborah O'Bine, RPR, Certified Court Reporter No. 63, for the State of New Mexico.

ORIGINAL

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Examiner Hearing
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A P P E A R A N C E S

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BY: WILLIAM F. CARR, ESQ.

EXAMINER CATANACH: Let's call the hearing back to order at this time. At this time we'll call Case 10847.

MR. STOVALL: Application of Mitchell Energy Corporation for an exception to Rule (2) of the Special Rules and Regulations for the North Osudo-Morrow Gas Pool to allow a second well on a proration unit, or in the alternative, to establish infill drilling procedures for said pool, Lea County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin appearing on behalf of the applicant. I have three witnesses to be sworn.

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr, Berge & Sheridan. We represent Nearburg Producing Company. I do not intend to call a witness.

EXAMINER CATANACH: Any additional appearances? Will the three witnesses please stand to be sworn in.

(Witnesses sworn.)

MR. KELLAHIN: Mr. Examiner, Mitchell Energy is seeking a rule change for the North Osudo-Morrow Gas Pool. The pool was originally established in 1965 with a special rule provision for 640-acre gas spacing. The temporary rules for that pool were made permanent in August of 1968 under Order No. R-3305A. The operation in the pool has been such that there are a number of sections that have multiple wells on the section.

We believe that not having an infill drilling option or the opportunity for a second well on a section has limited development in the pool, is a wasteful limitation, and we're seeking to have the flexibility introduced into the rules where the operators would have the opportunity but not the obligation to drill a second well.

In the event the Division determines it is not appropriate to make a poolwide change, we would ask for special relief for our Section 30, which is at the south end of the pool, so that Mitchell could have a second well on that section which could be produced concurrently with an existing well.

I have three witnesses. My first witness is a geologic expert in this area. The second is an engineering witness. And then finally the land

testimony concerning notification to the operators and interest owners in the pool.

At this time I'd like to call my geologic witness, Mr. Dave Alderks.

DAVID F. ALDERKS,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name and occupation.

A. My name is David F. Alderks. I'm a geologist.

Q. On prior occasions, Mr. Alderks, have you testified before this Division?

A. No, I have not.

Q. Give us a summary of your education and employment background as a petroleum geologist.

A. I received a bachelor's in geology from Brigham Young University in Provo, Utah, in 1977. Received a master's degree from the University of Wisconsin in Milwaukee, Wisconsin, in 1979.

I initially went to work for Unocal in Midland, Texas, with responsibilities in Texas. I then moved on to Union Texas Petroleum with

responsibilities in Texas, New Mexico, North Dakota, Montoya, Wyoming, and Michigan. I then went to work with a small independent, Barbara Fasken in Midland, Texas, with responsibilities in New Mexico, primarily, and also North Dakota and Michigan.

I then also have for the last two and a half years been working with Mitchell Energy, primarily in New Mexico.

Q. Do you have experience as a geologist in mapping, identifying and locating wells for Morrow sand channel production in the Permian Basin?

A. Yes, sir.

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

EXAMINER CATANACH: He is so qualified.

Q. (BY MR. KELLAHIN) Let me have you take the first display so we can simply orient the examiner to the area. It's marked as Mitchell Exhibit No. 1. And before we talk about your work, let's have you identify for the Division the current boundary of the pool and other information you've shown on Exhibit No. 1.

A. On Exhibit 1, the current boundary of this pool is delineated with the green ink in Townships 19 South and 36 East and 20 South, 36 East. Mitchell

Energy acreage is delineated in yellow. Full interest is colored solid, and partial interest is colored in the hachured area.

The wells on here are wells that have penetrated and produced from the Morrow. There are shallow wells that have been left off this display.

Q. Mr. Carr has entered an appearance for Nearburg Producing Company. Where is the well that they operate?

A. Their well is located in Section 30 at the extreme northern part of this unit.

Q. Build for us a picture if you will, give us a description of the geologic environment, the setting for this particular production of the Morrow pool.

A. The Morrow sands are channel type sands in this area are trending from north to south. These sands have been deposited along a bench associated with the central basin platform. The sands pinch out to the east along the central basin platform and then thicken to the west when they go across a fault, which we'll see on a subsequent display.

These sands meander through the area, and they are laterally and vertically discontinuous. And, as such, a well in any one location may encounter the same or different sands.

Q. Are you familiar with other Morrow pools in New Mexico that have a similar environment or sand deposition in a channel orientation?

A. Yes. Most of the pools that I have worked with do have a similar tendency.

Q. Do you see any unique geologic feature, function, or characteristic that would cause you to conclude that this somehow is different in this pool than you would find Morrow production in any other pool in southeastern New Mexico?

A. No, I do not.

Q. Is there any kind of correlation, a direct correlation between sand thickness and productivity of these gas wells?

A. Generally, if you have a good thick sand that is porous, you will get a better well than one that is thin and tight.

Q. What is the strategy employed by you and other operators in this type of exploration and production in order to optimize the opportunity to recover the greatest amount of gas from the pool?

A. We construct cross-sections, and we construct our isopachs, trying to devise where the reservoir-quality rock is located. We do that by determining the cleanliness of the sand from the gamma

ray curve, as well as looking at the porosity from density logs.

Q. Do you have a geologic opinion as to whether or not there is sufficient geologic data for the pool from which you can construct and interpret such maps?

A. Yes, especially in the southern part of this pool. There's sufficient well density that we can -- we feel confident that we can put these channels through there.

Q. Based upon that data and those interpretations, were you able to reach any geologic conclusions about the appropriate number of wells per section in order to create the greatest opportunity to recover the most volume of ultimate gas?

A. Yes. We've determined that these channels that are running through there, as I stated, are discontinuous. They look like they're about a quarter mile to a half mile wide, and they meander through this area such that one well may not actually recover all the gas that is in place because it may not encounter the sands that are in and moving from one part of the section to another part of the section. We are dealing with different sands. These sands are laterally discontinuous.

Q. Let's turn to your displays and have you lead us through then the reasoning that you have undertaken to support the conclusions you've just made.

A. Exhibit 2 is a structure map. We are concerning ourselves with the southern portion of this unit because that's where our acreage is. On this structure map you can see that there are some structurally high positions off to the east. We have a fault that runs down from Section 18 down across Township 20 South, 35 East, through Section 36, and then on down. It is isolating a block in Township 20 South, 36.

The sands lie along a little bench there, situated right in between the structurally high positions, and then as the contours tighten up, these sands go over this edge. Production is located by the blue dots, which indicate Morrow production.

As you notice in Section 30, we have a structurally high position on the east side as well as an untested structural high position in the southwest quarter of that section. The proposed Union State No. 3 is located in Unit K of Section 30 in the southwest part of that section and is designed to take structural advantage of this untested high where we

anticipate sands to be developed.

Q. When we look at this map and see the color code for Morrow producers in the pool, that simply reflects wells that have produced in the pool at any time in the pool life, history of the pool?

A. That is correct.

Q. Let's look at Section 30. Based upon structure, would a single well be appropriate for exploring for Morrow gas production within that section?

A. I do not think so.

Q. Why not?

A. Because you have two structural features there. You have multiple sands that are crossing that section that cannot be drained by one well.

Q. Let's look at the cross-sections you said you prepared.

A. Yes.

Q. Two cross-sections. Let's look at the first one. It's marked Exhibit No. 3. Describe for us the wells you've selected to show on the cross-section.

A. This is a north-south cross-section. We start on the south with a Texaco well located in Section 31 to the south of the acreage in question.

This well produced from a middle Morrow pay interval. Those pay intervals that I've mapped and you'll see in a minute are indicated on the right part of that cross-section with the red.

We then come up to our proposed location where we anticipate that middle Morrow pay sand to be found, as well as potentially upper Morrow sands and perhaps even some lower sands.

We then come over to the Jake Hamon Union State No. 1, which was drilled in 1966. This well was perfed in the upper pay sand and the middle pay sand, as well as some additional ones.

You can notice here the differing qualities of the sand and how these sands tend to be coming and going across this section.

We then come to the Union State No. 2, which Mitchell currently produces. This well is perfed in the upper sand interval, as well as in the lower sand interval. This well has currently made about 2.8 Bcf of gas.

Q. Let's stop with those two wells. These are both wells in your Section 30?

A. Yes, sir.

Q. The well in Unit letter H is the old Hamon well?

A. Yes, it is.

Q. It recovered 3.9 Bcf of gas?

A. Yes.

Q. You go 40 acres north, and you get to Unit letter A, and that's the Mitchell Union State 2?

A. Yes.

Q. Help us compare those two wells in terms of the opportunity to expose to production a single sand member in each of those two wells.

A. Yes. If you look in a 40-acre difference there, you can see, starting on the top in the Union State No. 2, we have a nice good clean sand that's approximately 14 or so feet thick, with some excellent porosity.

As you go 40 acres south, the next location in H, you can see that the correlative zone there has approximately two feet or so of sand in that same correlative interval. It has been perfed in that interval. These sands are thickening and thinning from one location to the next.

We then go to the Union State No. 1 which had some sands in the middle which are almost nonexistent immediately to the north.

Q. You're going to that large perforated interval that is the perforation second from the

bottom in series of perfs?

A. That is correct, yes. That sand, as you trace along, is two thin little stringers in the Union State No. 2, indicating the discontinuity and changes that are occurring there.

We then have some additional sand lenses that have produced in the Union State No. 1, perhaps could produce in the Union State No. 2, and would certainly be looked at for recompletion.

And then the Union State No. 1 was not drilled deep enough for the gamma ray to give a character of the sand, the cleanliness of the sand. It was not perforated. However, the Union State No. 2 does have a good clean sand with porosity developed at the base.

So we are seeing a difference in the continuity of these sands north to south in this interval.

Q. What is the current status of the Mitchell Union State No. 2 well? Is it still a producing gas well?

A. It is producing approximately 50 Mcf a day.

Q. Compare the vintages of the two wells, starting with the Jake Hamon well. That's a 1966 well?

A. That was drilled in 1966. It had a casing problem or mechanical problem in about 1979, at which point the Union State No. 2 was drilled. The Union State No. 1 was abandoned and plugged in 1983 but did not produce from 1979 to 1983. The Union State has been producing since 1979.

Q. Do you happen to recall from memory the producing abilities of the Hamon Union State 1 well in, what, '79, you said? When did it last stop producing?

A. It was in 1979. No, sir, I do not.

Q. That well was then abandoned after almost 6 Bcf of gas?

A. That is true.

Q. You can go 40 acres north and recover another Bcf?

A. That is true.

Q. What's the explanation for that?

A. We have lateral discontinuity between the sands.

Q. Let's take the other orientation, and let's go east-west and see what happens.

A. Okay.

Q. Describe for us why you've chosen these three wells to depict the east-west orientation of the

reservoir.

A. I began with the Union State No. 2, which is currently producing in our acreage. I then went over to the Texas Oil & Gas, now Marathon, Osudo State No. 1, which is 40 acres to the east of the Union State No. 2. Then down to the Alpha 21 production in Unit letter J of Section 29. The two wells in Section 29 are currently producing from the Morrow sands.

Q. We're back on the Mitchell Union State No. 2 well. Let's compare that well to its 40-acre offset to the east, which is now, what, the Marathon-operated Osudo State No. 1?

A. Yes. That well has some good upper Morrow sand developed in both of those wells, but as you look, the sand quality diminishes to the east in the Osudo State No. 1 in the rest of the sands.

We do have some sand developed down at the very bottom of the lower pay sand in the Osudo State No. 1, but that has not produced at all.

Q. What's the vintage of Marathon's Osudo State No. 1 well?

A. It was drilled approximately the same time as the Union State No. 2 well.

Q. Geologically, are these two wells competing for the same gas reserves?

A. Perhaps in that upper pay zone they are but definitely not in the lower pay zone because that's not been produced in the Osudo State No. 1.

Q. So, again, going east and west, you find the same relationship as you do north and south in this area, that you can move 40 acres away and break the continuity of a sand member of the pool?

A. That is true.

Q. Have you prepared isopachs on the principal sand members that have been productive in the pool?

A. Yes, sir.

Q. How have you identified them? What is the nomenclature we should use?

A. I started with the Union State No. 2 well looking for the perfed intervals, because that's what we were looking for.

Q. Let's follow one on a cross-section then so that I can see, when we turn to the isopach, the interval and the location of that interval that you're trying to map with the isopach.

A. Yes. That's identified by the red tape or the red ink on your cross-section on the edge where it says either upper, middle, or lower Morrow pay interval. That will be on the left-hand side of that cross-section.

Q. When you examine production out of the pool, do you find wells that will produce gas out of the pool that is located other than in one of these three members?

A. Yes, sir.

Q. So we haven't mapped it all?

A. No, sir.

Q. Why have you chosen these three?

A. They're the three productive intervals that were on Mitchell acreage.

Q. Let's turn to the first one, the upper one. What is the mapping criteria for the isopach? It's Exhibit No. 5.

A. The first thing that we do is look for clean sand. And we've taken an arbitrary 50 API gamma unit cutoff and said that anything cleaner than 50 units can be counted. And then we add to that the porosity in excess of 7 percent density porosity. And where we get both of them coming together, then we start counting sand. That gives us reservoir quality sand.

Q. Why have you used those cutoffs to identify reservoir quality sand?

A. Because we have to have reservoir quality in order to produce.

Q. Do you know that values at those levels, if you exceed them, will produce reservoir quality sand?

A. Yes, sir.

Q. You know that by experience for drilling successful wells with that kind of criteria?

A. Yes, sir.

Q. Let's look at the map for the upper Morrow. What does it show you?

A. This shows us a channel developed where we have -- where we anticipate up to 20 feet of good clean sand being deposited in this channel. We can see where we have wells that are drilled down where they encountered no sand, as indicated by the zeros. The zeros on the east side and west side delineate the boundaries of this channel sand.

We then have production indicated on the updip side of this sand in here. We believe that a good portion of this channel is as yet untested, and we believe that the Union State No. 3 location will test some more of this channel.

Q. Do you happen to know the names of the pools in the Morrow channel sand that are around your area?

A. There's the Osudo West, which is just to the west.

Q. What's the spacing for that pool?

A. I believe it's 320 acres, but I'm not sure.

Q. Do you know by name the other pools that may be around you that are Morrow gas pools?

A. Not off the top of my head.

Q. Do you see any relationship between the two pools that constitutes a geologic difference such that they should be spaced differently?

A. No, sir.

Q. Let's look at Section 30 with regards to this isopach. What does it tell you in terms of how to best exploit the gas reserves that are in Section 30?

A. It tells us that we are on the edge where the Union State No. 1 and the Union State No. 2 were drilled. The main body of the sand appears to be located to the west of that.

In addition, as we refer to the structure map, the proposed location will be in a structurally positive position, which will hopefully encounter hydrocarbons that cannot be recovered by the existing wells.

Q. Turn now to Exhibit 6. Identify and describe what you've done when you have mapped the middle producing Morrow pay member of the pool.

A. We map this the same way as we mapped the opposite one with the same parameters, with 70 percent clean sands and 7 percent or greater density porosity. In here we can see that we have two channels being developed, one on the west side and one on the east side. Most of the production has come from the eastern channel.

The only well that has produced in the western channel is the Union State No. 1, which had 13 feet.

As you look at the discontinuity of those sands, we go from the Union State No. 1 with 13 feet to the Union State No. 2 that has two feet of sand. Then we go over to the Marathon well in Section 29 that had no feet of sand meeting these criteria. This zero then extends north, indicating this lack of sand and the ability for us to contour to the channels running through here in this interval.

We also see that there are some other sands off to the west in Section 35 of the township to the west. These wells have produced in economic quantities but on the downthrown side of the fault that runs through there. So we believe that what we have here is a well that will recover essentially new hydrocarbons from this middle Morrow isopach interval.

Also, as we compare that with our structure map, we do have a ridge that seems to extend into the southern part of Section 30 and the northern part of Section 31, which tends to isolate our acreage from wells to the south.

Q. Let's turn now to the mapping of the lower Morrow pay and the isopach which is depicted on Exhibit No. 7. Describe that for us.

A. Again, we use the same criteria for depicting where this reservoir quality sand is. We see again the zero boundaries on the east and on the west. We have what we anticipate upwards to perhaps 30 feet of sand in this lower interval. Again, this sand is shifting more to the west. Our location will encounter sands in a structurally positive position to the existing wells.

Q. Based upon your geologic study, Mr. Alderks, do you have a recommendation to the examiner as to what to do in order to provide an opportunity to maximize ultimate gas recovery out of the pool?

A. Yes, sir. We recommend that Mitchell be granted the ability to drill this well in Section 30 to recover additional gas which is not recoverable by the existing wells.

Q. Is this rate acceleration, or is it the

opportunity to recover gas that would not otherwise be recovered from the other well?

A. This is the opportunity to recover additional reserves.

Q. The request of Mitchell to the Division is to provide this same flexibility and opportunity to anyone in the pool and to do so by pool rule change that allows an operational second well in the pool for that section?

A. Yes, sir.

Q. In the alternative, you're seeking to have special relief for Section 30 so that you can go ahead and drill this specific location?

A. Yes, sir.

MR. KELLAHIN: That concludes my examination of Mr. Alderks. We move the introduction of his Exhibits 1 through 7.

EXAMINER CATANACH: Exhibits 1 through 7 will be admitted into evidence.

EXAMINER CATANACH: Mr. Carr?

MR. CARR: I have no questions.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Alderks, the upper, middle, and lower sands appear to be present entirely within Section

30. The thickness just seems to vary within the section; is that correct?

A. The thickness varies, yes, it does.

Q. So they are pretty much continuous throughout the section?

A. They may be continuous. As you look at the cross-sections, however, there could be some indication that perhaps they are shifting somewhat from one area in a section to another area.

Q. Have you seen any kind of geologic evidence that there is any kind of lateral barrier to drainage in these sands?

A. No, I've not seen anything. However, you do have to have the correct structure in there, and we do think we might have a little saddle in there based on that structure map where we have an isolated structural high in the southern part of that section.

Q. Within the Union State No. 1 and No. 2, all the sands appear to be -- the same sands appear to be present in both wells. Is that a fair statement?

A. The sands appear to be present is correct. The quality of the sands differs from well to well.

Q. Do you have any evidence that shows that there's a sand present at your proposed location that may not have been encountered in the Union State No. 1

and 2?

A. Based on the well density in there, right now it looks like we have the ability to get any and all of those sands present there. There's always the possibility that you can get isolated sands showing up at any given spot. I refer to, in Section 19, the well on the east side there, there is no sand that is present there that does not appear to be present in other wells, just underneath the upper Morrow pay interval.

Q. The main focus of your presentation appears to be concentrated within Section 30. Do you feel like you have enough data poolwide to justify infill drilling?

A. In Section 29, to the east of us, there are two wells currently producing within the pool. As we look -- as we go back to Exhibit 1, Section 18, there were two wells that have produced out of that interval. Section 17, three wells have been drilled and produced out of that interval, and I believe all three of those wells have produced at the same time.

In Section 20, there are two wells that have produced within that section in economic quantities, and also the Union State No. 1 and the Union State No. 2 both produced in economic

quantities. There are many instances in the surrounding area where we have wells that produce in economic quantities, more than one well per 640-acre proration unit.

As we go south of this unit, we encounter in Section 5 down there, the British American Oil, that well has produced in excess of 25 billion cubic feet. One location to the north, the well has produced in excess of 8 billion cubic feet. So we have some massive gas potential in this area that does not appear to be limited by close proximity to another producing well. So we think that at least in the southern part of this unit, we have inadequate spacing right now or inadequate ability to produce the gas that may be there.

Q. Did you say that in Section 29 there are currently two wells producing?

A. Yes, sir, I did.

Q. And in what other section does that situation exist?

A. In Section 17 in the past, there have been three wells that produced simultaneously. They're not currently all producing.

Q. Section 18 you said --

A. There have been two wells that produced in

Section 18.

Q. That's not currently?

A. We have indication that one of those wells is currently plugged right now, but also indicating that one well was insufficient to drain that acreage.

Q. In Section 20?

A. Section 20, there were two wells that have produced, both of which are currently not producing. The Hamon well in the northwest-northwest was plugged in 1986. The Hamon well in the northeast of the southwest last produced in 1987.

Q. You mentioned that the -- let's see, the Union State No. 1 is currently plugged?

A. Yes, sir.

Q. And recovered some 5.9 Bcf. You mentioned that it had some mechanical difficulties?

A. Yes. There was some casing collapse or something in there that necessitated no reentry possibility. I'm not completely familiar with all the engineering aspects of that well.

Q. Was the Union State No. 2 well drilled subsequent to the plugging of the No. 1?

A. No. The Union State No. 2 was drilled prior to the plugging but after last production of the well, of the Union State No. 1.

Q. This is probably getting into the engineering, but do you have an opinion whether or not the Union State No. 1 would have recovered additional reserves that may have been recovered by the No. 2?

A. I'd really like to defer that to the engineers.

EXAMINER CATANACH: Okay. In that case, I don't have anything further of the witness. He may be excused.

MR. KELLAHIN: Call at this time Carl Richard. Mr. Richard is the petroleum engineer for this application.

CARL RICHARD,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. KELLAHIN:

Q. Please state your name and occupation.

A. My name is Carl Richard. I'm a senior reservoir engineer for Mitchell Energy in The Woodlands, Texas.

Q. Mr. Richard, have you testified as a petroleum engineer before the Division on prior occasions?

A. Yes, I have.

Q. Have you prepared an engineering investigation to determine whether or not you could reach engineering conclusions about the appropriateness of having an infill option for the North Osudo-Morrow Gas Pool?

A. Yes, I have.

Q. What conclusion have you reached?

A. After reviewing the geology, the production information, performing a reserve analysis, I conclude through my review that there should be sufficient reserves to economically justify drilling a Morrow well in the southwest quarter of Section 30.

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

EXAMINER CATANACH: He is so qualified.

Q. (BY MR. KELLAHIN) Does that analysis also tell you anything about the appropriate spacing for the pool?

A. Well, as Mr. Alderks mentioned, the Osudo West field due west of our acreage and the Osudo field to the south are both on statewide 320-acre spacing. My experience has been in the Morrow, the lateral discontinuities that we see in the Morrow in general, that 320 acres sometimes is not drained. I think that applies in this particular area as well.

Q. What would you recommend the examiner do with regards to any pool rule change in order to solve that problem?

A. I would recommend an exception be granted to drill a 320-acre proration unit in the west half of Section 30.

Q. In addition, do your engineering conclusions support providing an infill option rule, an infill drilling option for the entire pool so that any operator in the pool would have the same opportunity you're seeking to exercise?

A. Yes.

Q. Mr. Alderks' mapping of the three primary pay zones of the pool for your section shows that at least when you look at an isopach, you can find that there are portions of the section where all three sand packages are going to be in place so that a single well might encounter all three. If that circumstance should exist in Section 30, would that allow a single well, in your opinion, to deplete the entire remaining gas reserves for the section?

A. No, sir.

Q. Have you done any engineering calculations to determine the effective drainage areas of some of these wells that have already been producing for some

period of time?

A. Yes, sir, I have.

Q. Before we talk about the details of the map, describe the method. What methodology did you employ as a reservoir engineer to examine that issue?

A. Well, what I did first is I went through and I examined logs that I had available to me primarily in the southern part of this pool area, determined a number of petrophysical parameters. Using those petrophysical parameters and a 75 percent recovery efficiency, I calculated recoverable gas in place.

Then taking the production from each one of these wells that have ceased producing and then those wells that were still producing, calculating estimated ultimates, I went through and determined, using that recoverable gas in place, an estimated drainage area for each one of these wells.

Q. Have you reduced that information to a summary display?

A. I sure have. That's Exhibit 7.

Q. 8?

A. 8.

Q. I think so.

A. I'm sorry.

Q. 8? Okay. The method used was the same for each of the calculations?

A. Yes, sir, using the differing petrophysical parameters, coming up with a different gas in place, but using a common recovery efficiency of 75 percent.

Q. Let's go through the spreadsheet and look at some examples. All right?

A. Yes, sir.

Q. If you'll look on the exhibit and find the drainage area that you calculated, which is the second to right column?

A. Right.

Q. It says Area Drained in Acres. For these wells, regardless of the zone drained, you have drainage areas calculated in acres to range between what number and what number?

A. I have 11 acres all the way up to 418 acres.

Q. Did you find any example in the pool of any well that had the capacity or ability to drain 640 acres?

A. No, sir, I did not.

Q. Is the largest single example of a drainage area for a well the Jake Hamon State E 1 well that had 418 acres?

A. Yes, sir. That is the best producer or best well in the pool.

Q. Let's look at Exhibit 9, as well as Exhibit 8, so it will help us locate the wells. I'm interested in the relationship what is now the Marathon well to the two wells that were produced in Section 30. There's a three-well area.

A. Right.

Q. Okay? When we look at Mr. Alderks' geologic displays, we find that the Marathon well was perforated and produced from the upper Morrow pay interval. We look at his upper pay interval net isopach, it gives him ten feet. Okay?

A. Yes, sir.

Q. It cum'd 5.8 Bcf of gas out of that zone. What do you calculate that zone to have drained, if you will, under the assumptions of the drainage calculation that you made?

A. Well, that well has cum'd 5.7 Bcf. Based on decline curve analysis, I've come up with estimated ultimate of about 7.3 Bcf. Using that 7.3 Bcf, I calculated an estimated drainage area of 368 acres.

Q. Let's go 40-acre offset to the west and pick up the Mitchell Energy Union State well. Okay? You find that well, and it has been produced out of

both the upper and the lower pay on the isopachs, you get 16 feet out of the upper, you get 18 feet out of the lower, what do you show for its cum and ultimate gas recovery?

A. That well is still currently producing. Based on decline curve analysis, I have an estimated ultimate of 2.9 Bcf. That results in an area drained of about 109 acres.

Q. Do your calculations separate out the two sand members, one from another, in that wellbore? That won't do it, will it?

A. Well, normally, if I was to do drainage or circular drainage calculations, if I was producing out of a common member, I would combine the cum's and probably draw a circular drainage radius from a common point.

In this case, because I do have combinations of them, I chose to represent them on this map as individual drainage areas.

Q. When we look at the volume of gas that you have projected for the ultimate gas recovery for the Mitchell well, it's the No. 2 well, row 2 of Exhibit 8 spreadsheet?

A. Yes, sir.

Q. That ultimate gas recovery is just short of

3 Bcf?

A. Yes, sir.

Q. That is done from decline curve analysis?

A. Yes, sir.

Q. Based upon current perforations in that wellbore?

A. Yes.

Q. You have by methodology, at least, combined the effect of both the upper and the lower pay contributions in that wellbore?

A. That's correct.

Q. So the drainage calculation is not going to tell you what each individual sand member effectively has drained?

A. That's correct.

Q. All right. When we look at the circle map, the bubble map?

A. Yes, sir.

Q. Obviously, you're not going to have a wellbore that's going to have overlapping drainage circles with its offsetting wellbore?

A. Technically.

Q. Yes. What are you trying to represent with the drainage circles?

A. Just the area drained by the specific

intervals that are perforated in that particular wellbore.

Q. Can we draw the engineering conclusion from the relationship between the Marathon well and your Union State 2 that as those wells compete with each other in the reservoir, they're competing, to some extent, for different sand members' contribution of gas?

A. Yes, we can.

Q. You know that as a fact, don't you?

A. Yes, sir, based on the perforated intervals.

Q. What does that example tell you about appropriate spacing for wells in the pool?

A. Well, at current spacing, 640 acres is inadequate in draining the south or the western half of Section 30.

Q. Can you also conclude that in the absence of the Mitchell Union State well, that the Marathon well would not have recovered all the gas that is now being produced in part by the Mitchell Energy well?

A. Yes, sir.

Q. Those wells are competing for slightly different sources of supply?

A. Yes, sir.

Q. Let's look at what's happened to gas reserves in Section 30. Have you prepared a volumetric analysis of the gas reserves that underlies that section?

A. Yes, sir, I have.

Q. That's Exhibit No. 10?

A. Yes, sir.

Q. Describe for us what you've done.

A. Ideally what I've done is taken the isopachs for each one of the members that Mr. Alderks has mapped and assumed that I would be able to encounter the net footage that he's got isopached there.

What I've done is planimetered Section 30 and determined that the total volume for the upper, middle, and lower members, applied a recoverable gas in place, again using 75 percent recovery efficiency, and estimated the recoverable gas in place for Section 30. That figure on Exhibit 10 is 31.5 Bcf.

Q. Make sure I've got it figured out. That is estimated recoverable gas for the area contained based upon isopach analysis underlying Section 30?

A. Yes, sir.

Q. To get recoverable gas for the section, have you assumed a percentage recovery?

A. In the gas in place calculation, that recovery efficiency was 75 percent, if I understood your question correct.

Q. Yes, sir. So the 31.5 Bcf of gas is recoverable of gas assuming a 75 percent efficiency of recovery?

A. That's correct.

Q. Of the 31.5 Bcf of gas, how much of the gas has been recovered by the combination of the existing two wells in that section?

A. That's the next line. 8.7 Bcf has been recovered to date.

Q. Can you extrapolate or forecast for us what is to be the ultimate recovery from those two wells of the recoverable gas?

A. The Union State No. 2 is the only well producing currently in Section 30, and it is estimated to have about 165 million, which will increase this 8.7 by that amount, roughly 8.9 Bcf.

Q. So despite the fact that the Mitchell Union State 2 well encountered two of the three sand members, it's got a tiny bit of show, two feet in the middle member, but predominantly from two of the sand members, it's going to get 8.8 Bcf of gas, combination of those two wells, leaving in the reservoir left to

be recovered 22.5 Bcf of gas?

A. Yes, sir, ideally.

Q. How do you get the rest of it?

A. I would propose by drilling a second well.

Q. If you don't drill a second well, what happens?

A. I would assume that we would not be able to recover a significant amount of reserves in Section 30.

Q. Is that the way we ought to be operating this reservoir?

A. No, sir.

MR. KELLAHIN: No further questions.

Move the introduction of Mr. Richard's Exhibits 8, 9, and 10.

EXAMINER CATANACH: Exhibits 8, 9, and 10 will be admitted as evidence.

MR. CARR: I have no questions of this witness.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Richard, what is the remaining life of the No. 2 well?

A. I've got down to an economic limit of about 1.1 million a month, I've probably got about six years

remaining life is what I've projected.

Q. Do you know what the current rate is on that well?

A. Yes, sir, about 58 Mcf a day.

Q. Fifty-eight Mcf?

A. Yes, sir.

Q. I don't suppose Mitchell was present when this pool was established or the rules were established?

A. No, sir. This acreage was acquired under an Amoco purchase in, I think, 1990.

Q. Do you know anything about why the initial pool rules were established at 640 acres?

A. No, I do not.

Q. Do you know what the discovery well or the wells that were present early in the life of the field were?

A. I think the earliest well I have production from, production information from, is the Jake L. Hamon Union State No. 1. It was drilled in '66. I don't see anything -- I was thinking I might have had -- up in Section 17, Unit letter N, I also have a well that was drilled in 1966, but I don't see any that were prior to that date from a production history standpoint.

Q. Your Exhibit No. 8, is this an analysis of all the wells that produced in the pool?

A. No, sir, it is not. I was rather limited as to the amount of log information I could get my hands on in a short period of time. As you can see, I've had to make some assumptions, say, those wells that I did not have resistivity logs on, I assumed saturations, and those wells I didn't have porosity logs on, the very last well, No. 7, I had to assume an average porosity to come up with a drainage calculation for it.

I guess I was concentrating more on the southern part of the pool.

Q. Were any of the geologic parameters, porosity, permeability, were any of them significantly different in each of the respective producing intervals such that one might drain 640 while the other one might drain substantially less than that?

A. What I've done in this summary, the height calculation or the footage calculation that I've used basically is not using the same porosity cutoff as our geologic isopachs for the prime reason is, I chose to upgrade, if you will, the productive interval, not just the reservoir quality interval but the probable productive interval.

If I was to take his net maps with less, I guess, stringent porosity cutoffs, I probably could have had a lot smaller drainage areas, but what I've done here is assume probably the worst case scenario for drainage, if you will.

I don't think I've answered your question specifically whether or not I see the same quality across. If you look at the cross-sections, the upper member is present. It varies in quality somewhat, but I can't say whether or not that upper member will extend down in the southwest quarter.

Q. There may have been some wells that have been drilled and produced in this pool whose drainage area may have exceeded anything you've got on this. Is that your opinion? Is that a safe assumption, or is that not a safe assumption?

A. I guess in my calculations -- yes, that is possible. It's possible but, in my opinion, not probable. I think the No. 6 that I have there with the 418 acres drainage area calculation, I'm perforated at a very small interval, 17 feet.

In some of these wells I'm perforated in tremendously large intervals. It's reported as a gross interval. I think that well having the highest cum and probably the smallest number of feet

perforated and produced from probably has one of the larger drainage areas to be calculated in this pool. I don't see anything with significantly higher cumulative production. Therefore, I would assume that nothing has exceeded that drainage.

Q. On your estimate of recoverable remaining reserves in Section 30, that's just based upon the geologic interpretation and the assumption in fact that the sands are present and are that thick and are as thick as the geologist has mapped them?

A. Yes, sir, that's correct. So the two are different.

Q. In your opinion, is there any correlative rights issue if you've got two wells, or is Marathon the operator of Section 29?

A. Yes, sir, they are.

Q. Having two wells and producing two wells, do you feel that's -- is there a correlative rights issue at work here, too, in that you think you need two wells to compete with them, or is that not an issue?

A. I don't think it's an issue.

EXAMINER CATANACH: I think that's all I have, Mr. Kellahin. The witness may be excused.

DON R. McCLUNG,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name and occupation.

A. My name is Don R. McClung. I'm a senior landman for Mitchell Energy Corporation in Midland, Texas.

Q. Mr. McClung, on prior occasions have you testified before the Division Examiner?

A. Yes, sir, I have.

Q. Mr. McClung, were you asked to attempt to tabulate a list of parties that might have an interest which would be affected by the outcome of a decision made in this particular case?

A. Yes, I was.

Q. Have you caused to be generated a list that includes all the operators of current production in the pool, as well as, to the best of your ability, interest owners that might be affected by the infill drilling option?

A. Yes, sir. That information shows up as our service list, which I believe is part of Exhibit 11.

MR. KELLAHIN: We tender Mr. McClung as an

expert petroleum landman.

EXAMINER CATANACH: He is so qualified.

Q. (BY MR. KELLAHIN) This is marked as Exhibit No. 11, Mr. McClung. Describe for us the method that was employed to generate the notice list.

A. I was asked to conduct a search of the records to determine the ownership of those sections contiguous to our section, being Mitchell Energy Corporation there in Section 30. The eight sections surrounding Section 30, of the eight, seven of them were state-owned minerals. And in that case what we did is order run sheets from Federal Abstract.

And the remaining section was fee acreage, and I checked that section at Cap Rock Abstract there in Midland, Texas.

Q. In addition, do your notice efforts include all operators of current producing wells in the pool?

A. Yes, sir.

Q. As a result of that effort, how many notices did you cause to be sent out of Mitchell's office concerning this application?

A. I believe approximately 121.

Q. As a result of that notification effort, have you received any inquiries from any of those parties for which notice was attempted?

A. No, sir.

Q. The Section 30 that is the specific topic of your company's concern, what is the acreage arrangement within Section 30?

A. It's covered by an operating agreement, 1965 vintage, January of 1965, and there's approximately seven different interest owners right now in Section 30.

Q. So the interest is currently consolidated for purposes of a 640 spacing unit?

A. Yes, sir.

Q. And it's currently dedicated to production from that existing well that's still productive?

A. Yes, sir.

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

We'd move the introduction of the Certificate of Notice which is marked as Mitchell Exhibit No. 11. It has been attested to by Mark Stephenson. He's present in the hearing room, and he can verify his certificate if the Division desires. But with the introduction of that exhibit, that concludes our presentation of witnesses and evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. McClung, does your list of interest owners represent all interest owners within the pool?

A. No, sir, just the sections contiguous to Section 30, as well as the operators in the pools.

Q. The operators in the pool. Not necessarily all the interest owners in the pool?

A. No, sir.

Q. Anybody outside the pool?

A. No.

Q. I'm a little bit confused here. You've got 121 different entities?

A. Yes, sir.

Q. Those aren't all operators?

A. No, sir. What we did is took all working interest owners. In the event there were unleased minerals, we were going to put those, but everything was leased around Section 30. So what you see represented on the list there basically is all working interest owners, owners of operating rights, and also record title there in the state-owned minerals.

Q. Within Section 30 and all the sections around it?

A. Yes.

EXAMINER CATANACH: I don't have anything further, Mr. Kellahin. Mr. Carr?

MR. KELLAHIN: I may have some comments about it. I'm anxiously waiting to see what Mr. Carr has to say.

EXAMINER CATANACH: Okay, Mr. Carr, what do you have to say?

MR. CARR: May it please the Examiner, Nearburg Producing Company is an operator in the North Osudo-Morrow Gas Pool, which could be affected by this application. Nearburg has no objection to Mitchell Energy Corporation's request for an exception to Rule (2) of the Special Rules and Regulations to allow a second well to be drilled on the existing 640- acre spacing and proration unit comprised of Section 30, Township 20 South, Range 36 East.

Nearburg Producing Company, however, would oppose amendment of the pool rules to establish infill drilling procedures throughout the entire pool.

EXAMINER CATANACH: Mr. Kellahin?

MR. KELLAHIN: Mr. Catanach, we've got a dinosaur on our hands here. You can see as a practical matter, Mitchell has got offsetting operators that are currently producing more than a single gas well in this pool. You can see as a practical matter, the historical development has required more than a single gas well.

We think the time has come to upgrade the flexibility of these pool rules. The North Osudo-Morrow Gas Pool on 640 spacing is one of just two or three, I think, that are left on 640 spacing.

The original rules were adopted at the request of Pan-American Petroleum Corporation in 1967 by Examiner Elvis Utz. They apparently have stayed in place all this period of time. As a practical matter, people are ignoring the spacing rules and drilling additional wells.

We think the flexibility does no harm. It's the opportunity for unique reserves. It provides to Nearburg and all the rest the option but not the obligation to have a second well. The impact of granting this application will do nothing other than increase ultimate gas recovery from this pool, and we recommend that you grant approval of the pool rule change that Mitchell has sought to have adopted by the Division.

EXAMINER CATANACH: Thank you, Mr. Kellahin? Anything further in this case?

MR. KELLAHIN: No, sir.

EXAMINER CATANACH: There being nothing further, this case, 10847, will be taken under advisement.

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Deborah O'Bine, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that I caused my notes to be transcribed under my personal supervision, and that the foregoing transcript is a true and accurate record of the proceedings of said hearing.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL, October 16, 1993.

Deborah O'Bine

DEBORAH O'BINE
CCR No. 63

OFFICIAL SEAL
Deborah O'Bine
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: Sept 19, 1994

10847
October 7
93
David R Catanach
Oil Conservation Division