NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

Hearing Date JULY 11, 1996 Time: 8:15 A.M.

NAME	REPRESENTING	LOCATION
W. Kellahin	Kellahin & Kellahin	Santa Fe
LES CARNES	Matador Petroleum Corp	Midland, TX
Mark McClelland	Conoco	Midland, TX
Jerry Hoover	Conoco	Midland TX
Joe Miller	Conoco	Midland TX
Dave Neke	Conoco	midland, Tx
DENISE COX	MARATHON OIL	MIDLAND, TX
Ron Folse	MARATHON OIL	Midland, TX,
Cathy Colby	Richardson Operating Co.	Denver, Co
Dana Delventhal	" "	Farmington, NM

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

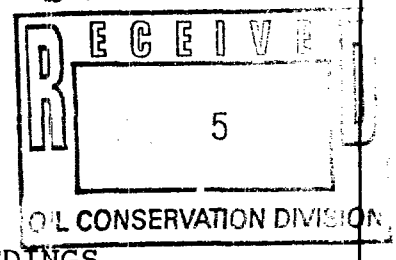
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF CONOCO, INC., TO EXTEND THE VERTICAL LIMITS FOR THE WARREN-SAN ANDRES POOL, TO RENAME SAID POOL AND FOR THE PROMULGATION OF SPECIAL RULES AND REGULATIONS THEREFOR, LEA COUNTY, NEW MEXICO

CASE NO. 11,567

ORIGINAL



REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

July 11th, 1996

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, July 11th, 1996, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

July 11th, 1996
Examiner Hearing
CASE NO. 11,567

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A P P E A R A N C E S

FOR THE APPLICANT:

KELLAHIN & KELLAHIN
117 N. Guadalupe
P.O. Box 2265
Santa Fe, New Mexico 87504-2265
By: W. THOMAS KELLAHIN

* * *

WHEREUPON, the following proceedings were had at 8:15 a.m.:

EXAMINER STOGNER: Hearing will come to order -- please note today's date, July 11th, 1996 -- to consider Docket Number 19-96. I'm Michael Stogner, appointed Hearing Officer for today's cases, and we're going to take these somewhat out of order. This is going to be a short day.

At this time I will call Case Number 11,567, which is the Application of Conoco, Incorporated, to extend the vertical limits for the Warren-San Andres Pool, to rename said pool and for the promulgation of special rules and regulations therefore, Lea County, New Mexico.

At this time I'll call for appearances.

MR. KELLAHIN: May it please the Examiner, my name is Tom Kellahin.

I'm with the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant, and I have two witnesses to be sworn.

EXAMINER STOGNER: Are there any other appearances?

Will the witnesses please stand to be sworn?

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, I have two witnesses to present to you.

Mr. Dave Nelson is a petroleum geologist with Conoco, and he's going to present the geologic picture for your consideration.

Mr. Mark McClelland is the petroleum engineer for this project, and he will present to you the engineering details.

By way of summary, Conoco is seeking to expand the vertical limits of what is currently identified as the Warren-San Andres Pool. They propose to include the Grayburg. Now, that's commonly done in New Mexico, and if that was the only request, it would have been accomplished through the District's office with the assistance of Mr. Sexton.

But Conoco has met extensively with Mr. Sexton and, with his approval and cooperation, has conducted tests on the three producing wells in the pool, and they have determined that there is a substantial cost savings, in excess of $900,000, to be realized by not only combining these two formations into one pool but to seek your approval for increasing the oil allowable from what I think is about 100 barrels a day -- is it 87?

MR. HOOVER: Eighty.

MR. KELLAHIN: Eighty, I'm sorry. It's 80 barrels a day currently, to 200 barrels a day on 40-acre oil spacing, and ask permission for a special gas-oil ratio

of 10,000 to 1.

As I mentioned, Mr. Sexton has been involved in allowing Conoco to run some tests of these various zones within particularly the San Andres, and as a result we want to show you the conclusions from that test and ask your permission, then, to extend the vertical limits of the pool to include the San Andres and the Grayburg for a special 200-barrel-of-oil-a-day allowable and a special gas-oil ratio of 10,000 to 1.

With that introduction, then, we'll call Mr. Dave Nelson.

DAVID E. NELSON,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. My name is David Nelson, and I'm employed by Conoco, presently as a geophysical advisor.

Q. On prior occasions, Mr. Nelson, have you testified before the Division as a qualified petroleum geologist?

A. Yes, I have.

Q. Pursuant to your employment, have you been the

geologist responsible on behalf of your company for involvement concerning geologic matters for what is known as the Warren-San Andres Pool?

A. Yes.

MR. KELLAHIN: We tender Mr. Nelson as an expert witness.

EXAMINER STOGNER: Mr. Nelson is so qualified.

Q. (By Mr. Kellahin) Let's take a moment, Mr. Nelson, and first put the Warren-San Andres Pool in some context within the State of New Mexico.

If you'll turn to what we've marked as Exhibit Number 1, identify and describe that display for us.

A. Exhibit Number 1 is an index map showing parts of southeast New Mexico and west Texas. It shows the Central Basin Platform province and the northwest shelf, and we have color-coded the existing Grayburg and San Andres fields.

Q. What's the significance of the color code?

A. The Grayburg fields and San Andres fields are colored differently, but we're primarily showing that most fields in the area already have combined Grayburg and San Andres.

There are just two instances of the Central Basin Platform portion of New Mexico in which there are just Grayburg fields, those being south of the present Warren-

San Andres Pool. And those primarily are Grayburg fields because that's the only formation that's been found productive there.

Q. All right. So the San Andres is not present, or if it is present, it is wet; is it not?

A. That is correct.

Q. Okay. What are you seeking to accomplish?

A. Well, what we would like to do is combine both the Grayburg and San Andres as one pool. This has been done in all the other fields around us. It's commonly recognized that these fields have similar producing characteristics.

Q. Identify for the Examiner the basis by which you're requesting a special oil allowable of 200 barrels of oil a day.

A. Well, the reason for asking for 200 barrels of oil per day depth allowable is because we have found multiple reservoirs within the San Andres, and when combining that with the Grayburg we have found that each of these zones is capable of production at a rate greater than the current depth allowable of 80 barrels a day.

Q. Does that appear to be unique for your particular area, as compared to other areas in New Mexico where the Division has combined the Grayburg and the San Andres formations?

A. Well, the other pools within the area are all under waterflood presently, and so there is no depth allowable established for those fields at this time. This would be -- This Warren-San Andres is under primary production.

Q. Historically, as the Grayburg and then the lower formation San Andres has been developed, what has been the strategy historically for that development? Would an operator drill to the Grayburg and stop and produce it? How did that occur?

A. Well, historically operators discovered what water-producing zones they found within the San Andres and would typically drill down to that lowest known oil -- or that water contact. And they would complete wells back up the borehole to shut off water-productive zones that were underneath them.

Q. In your area, have you found a unique circumstance where below the water in the San Andres there is yet another oil-producing member of the San Andres that is productive?

A. That's correct. We have found two separate zones within the San Andres. The upper part of the San Andres is producing oil. We've found a water leg to that. And then we've found a second oil zone underneath that water zone.

Q. Let me have you turn to what is marked as Exhibit

Number 2 and identify that for us.

A. Okay, Exhibit Number 2 is a structure map of the San Andres formation, the top of the formation.

The map is color-coded to indicate the blue areas and green areas are structurally low, the pink and yellow areas are structurally high.

And we're showing with this map also the boundary of the Warren Unit, which is a ratified unit, and --

Q. It's a voluntary unit for primary production, is it not, as to the San Andres and the Grayburg? You do not know?

A. No, it's not. It is a federal unit.

Q. All right, but it has been consolidated where all the interest owners have contractually agreed to some sharing arrangement?

A. Yes.

Q. Okay. And it's your interpretation that this structural feature is a closed feature, and is contained entirely within the Warren Unit?

A. That's correct.

Q. And Conoco is the operator of the unit?

A. Conoco is the operator of the unit.

Q. Did you find, Mr. Nelson, that you had sufficient well control by San Andres or Grayburg wells or wells drilled to a deeper depth for which you had logs of the San

Andres and Grayburg to give you an accurate and reliable interpretation of the structure?

A. Yes, we have. I have shown wells on this map that establish the control for mapping the present depth structure of the San Andres, and it's clear that this is a four-way closed anticline, entirely within the unit, with 60 feet of structural closure.

Q. All right, sir, let's turn to Exhibit Number 3, then, and have you identify and describe that display.

A. Okay, Exhibit Number 3 is a plat showing the current pool limits of the Warren-San Andres Pool, and it is confined to the southeast quarter of Section 28 of Township 20 South, Range 38 East.

The map also shows the three producing wells that we have within the pool presently, and these are the Warren Unit 125, Warren Unit 108 and the Warren Unit 100.

Q. What's the sequence as to which these wells were drilled, or the order?

A. The Warren Unit Number 108 was the exploratory test of the San Andres.

Extensive testing of this well established that there are these two separate intervals within the San Andres, the lower zone, and these are sandwiched by water production.

Q. The next --

A. The next well drilled was the Warren Unit 100, and we have tested Grayburg in the Warren Unit 100.

And then we followed that with an offset to the north in the Warren Unit 125. That's the third well within this Warren-San Andres Pool.

Q. All right, sir. Let's turn now to Exhibit Number 4 and have you identify and describe that display.

A. Okay, Exhibit Number 4 shows the proposed development of the Warren-Grayburg-San Andres Pool as we propose with this hearing.

We are showing an ultimate projected pool limit based on the structural geology of the pool. This contour is the spill point of the reservoir, at minus 560 feet subsea vertical depth.

Q. Okay, that minus 560 represents what you believe to be the lowest portion of the lower San Andres that would produce oil?

A. Yes, what this represents is the structural elevation of the top of the San Andres at the spill point.

Q. Okay, the spill point being the top --

A. Basically, we would not -- we would expect to see higher water production outside this limit and probably not see economic wells beyond that limit.

Q. Why was the San Andres only included in the vertical limits of the Warren-San Andres Pool? How do we

get to where we are now?

A. Yeah, well, initially the tests were conducted just for the San Andres. We attempted to stay away from the Grayburg, as we saw it as a separate formation that wouldn't likely be a separate pool under the existing rules. So we tested only the San Andres, and we tested multiple zones within that San Andres formation.

Q. Let's look at Exhibit 4 and identify the color code. Obviously the blue closed dots are the three current wells, and then you have wells -- future well locations -- identified by an open green circle, and then you have some checks representing other locations.

Describe what you're saying here.

A. Well, we have a proposed drilling program for the next two years -- well, including this year, 1996, and extending into 1997 -- to complete the development of the Grayburg and San Andres formations.

Q. The plan, then, is, as future wells are drilled, we would go through the conventional process of having the pool's horizontal boundaries expanded as the wells are completed and added under the Division's nomenclature procedure?

A. That's correct.

Q. All right. Let's look at Exhibit Number 5 and have you describe for us what would be a typical log

section for the formations in question.

A. Okay, Exhibit 5 is a type log of the proposed Warren-San Andres -- Warren-Grayburg-San Andres Pool. This is a log from the Warren Unit 108, which was the first well and the exploratory well for the San Andres Pool.

The point of this display is to show the stratigraphic names that we're applying to the formation, to show that the -- that both the Grayburg and the San Andres have been broken down by -- into zonations.

The upper part of the Grayburg we find to be tight, to be the seal for the reservoir.

The lower 60 feet of the Grayburg is productive.

And then the San Andres formation has been broken down into four zones which we have numbered sequentially downward, San Andres 1, 2, 3 and 4.

Q. Geologically, is the Grayburg physically isolated from the upper San Andres so that hydrocarbons could not flow from one formation to the other?

A. Well, we have not found a permeability barrier between the two formations. There is no porosity barrier either, so really these formations have no seal between them, and as we were to produce near the top of the San Andres, would probably be draining reserves from the Grayburg anyway.

Q. All right. Geologically, then, do you see any

reason to keep these two formations separated as two separate pools?

A. No.

Q. All right, let's turn to Exhibit 6 and have you identify and describe for us the cross-section.

It may be helpful to keep one of these locator maps out -- perhaps Exhibit 4 is a good locator -- so that we can follow the wells you've chosen on the three-well cross-section.

If you'll start, Mr. Nelson, by identifying for the Examiner why, on the far left side of Exhibit Number 6, you've chosen to identify the log for the Warren 112, as opposed to using the third well in the pool, which is 125?

A. Yes. Well, this cross-section is a north-south cross-section; north is on the left, south is on the right. We would have liked to use the Warren 125 in this cross-section, but we did not obtain open-hole logs on the well, so I really don't have anything for comparison to the others.

However, the Warren 112 is drilled on the same pad, and it's drilled for production deeper in the Blinebry, Tubb and Drinkard. So we've used the -- we've substituted the log curves from that well for the 125.

Q. Let's talk about the color code on the cross-section. When you as an expert geologist examine the logs

from these three wells, are you able from log examination alone to determine which portions of the San Andres are going to be oil-and-gas-bearing, as compared to water-bearing?

A. Well, it has been very difficult for us to identify the zones that will be oil-productive from water-productive in the San Andres, based on wireline logs alone. Extensive testing has been necessary in order for us to establish the characteristics.

Q. So the color code we see on Exhibit Number 6 represents the inconclusion that you and Mr. McClelland have come to based upon subsequent tests of these various zones within the San Andres?

A. Yes, sir. The color coding of green is to indicate oil-and-gas-bearing formations.

The San Andres zone 2 has been found to be water-bearing; the San Andres zone 3 has been found to be oil bearing; and then beneath that there is water-bearing zone 4.

Q. In order to control water production, if you will, is it going to be possible or necessary to produce, for example, only the upper San Andres separately from this San Andres number 3, which is the lower San Andres? Would you want to do that?

A. Do you mean for the purpose of water or for --

Q. For the purpose of maximizing oil production, would you want to maintain some separation?

A. Well, we have found that San Andres zone 3 is capable of at least 100 barrels of oil production a day, and that exceeds the current depth allowables.

Q. Okay.

A. And we have also found that San Andres Zone 1, and if you were to combine the Grayburg with that, is also capable of production of more than 100 barrels of oil per day.

Q. Okay. My question for you is, with regards to the water component of production, is it necessary, in your opinion, to maintain some separation, if you will, internally within the San Andres Pool?

A. Well, we've found that we can shut off a certain amount of the water by being selective with perforations.

Q. All right. And so operationally, you as the operator want the flexibility to produce the San Andres 1 and 3 in any combination?

A. That's correct.

Q. All right, sir. Geologically, there is not going to be any benefit to maintaining any separation in terms of pool rules between the San Andres 1 and San Andres 3?

A. No, there's not really a geologic reason to do that.

Q. Okay. What is the -- Have you correctly indicated the perforations on the logs on the cross-section here?

A. Yes.

Q. The red dots indicate what?

A. Yes, we have shown the perforated intervals that we have made in these wellbores. Those are shown by the red flags adjacent to the depth track on each well.

I am not showing you what the results of those tests are, but those will come up in the latter part of this testimony. So --

Q. Give us a sense of --

A. -- this shows, anyway, at least that we have perforated different intervals and we've isolated these zones and established the production characteristics of each of these perforated sets.

Q. Geologically now, we've seen the size and shape of the container contained within the structure. We now have a visual representation of what it looks like vertically.

Give us a sense geologically of how the hydrocarbons are distributed, and is there any kind of water drive or active water drive that's a component of the reservoir?

A. Well, in terms of analogy to other reservoirs, we

have found that there is a weak water drive in some reservoirs. For this pool, we are not yet certain as to what the drive mechanism really is. But by analogy we have found that there is a weak water drive to some Grayburg-San Andres reservoirs, but primarily it is a solution gas drive reservoir.

MR. KELLAHIN: That completes my examination of Mr. Nelson.

We would move at this time the introduction of his Exhibits 1 through 6.

EXAMINER STOGNER: Exhibits 1 through 6 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. In referencing to Exhibit Number 2 -- that's the color-code map -- there are quite a few well spots on here. What is the primary zone in which these wells are drilled to?

A. Most of these wells are drilled to the Blinebry-Tubb, as the Warren-Blinebry-Tubb Pool, and extend to the Drinkard, which has been also produced within this unit.

Off to the west there are a few wells -- this is in the northwest corner -- a few wells that have been drilled to the Ordovician McKee, and that is part of the Warren-McKee Pool.

Q. Okay. In referencing Exhibit Number 6 on that first well, you're utilizing the log off of the Warren Unit Number 12 -- 112?

A. 112, correct.

Q. The perforations shown, are those referencing to the Number 125?

A. That's correct. I've moved the perforations by -- well, within the 125 well onto this section. So it's the equivalent intervals in 112.

Q. Now, it's my understanding that the San Andres 1 and 3 zones, both being oil productive, that's an unusual situation in this area and that you have two producing zones in the San Andres?

A. Yeah, that's true. The offset fields, if you look to the Eunice Monument, which is to the west, is primarily productive from the Grayburg and just an upper part of the San Andres.

Q. What happens when you go west with the San Andres number 3 zone? Does it pinch out or --

A. Well, the zones are there stratigraphically, but apparently the oil production just hasn't been found in those intervals.

Q. Is it watered out, or are we seeing any --

A. I don't know, I don't know whether it's been tested or whether it's an operational decision because of

the Grayburg being the primary producing interval. And those are under waterflood. So it may be an operational choice to choose just the upper part of the San Andres to include in production.

Q. How about impermeable zones that separate the four zones in the San Andres? Is there an impermeable layer or is there vertical crossflow from the water to the oil and vice-versa?

A. Well, from this interpretation, I'd have to say that there must be vertical permeable barriers in order to establish a lower oil zone underwater. This formation is characteristically tight, and even our reservoir has perhaps 2 millidarcies of permeability.

Q. On that first well -- I believe that was the 108? --

A. Yes, sir.

Q. -- you show in your perforations here -- oh, I'm sorry, when I say "here", Exhibit Number 6 -- that you perforated throughout that water-bearing number 2 zone?

A. Yes.

Q. But you didn't repeat that action in the other two wells?

A. Right, we have not tested that zone again. We did put a submersible pump on that interval and pump up to 800 barrels a day of water.

In our plan, we do plan to come back and test in another well just to be certain of that being completely water-bearing. But the logs all indicate that is likely to be a water-producing zone, and our production testing has shown that.

EXAMINER STOGNER: I have no other questions of this witness, Mr. Kellahin. He may be excused, unless you have any.

MR. KELLAHIN: No, sir.

Call Mr. Mark McClelland.

MARK McCLELLAND,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. McClelland, would you please state your name and occupation?

A. Yes, my name is Mark McClelland. I'm a staff reservoir engineer with Conoco, located in Midland, Texas.

Q. Mr. McClelland, on prior occasions have you qualified as a petroleum engineer before the Division Examiner?

A. Yes, I have.

Q. And have you participated with Mr. Nelson in examining the technical aspects of this particular

Application?

A. Yes, I have.

Q. Were you involved in discussions with Jerry Sexton, the OCD supervisor in Hobbs, with regards to the Application?

A. Yes, I traveled to Hobbs with Mr. Hoover and another engineer to discuss this Application.

Q. And you discussed with Mr. Sexton the testing procedures that you conducted on your various wells, particularly, I believe, it was the 108?

A. Yes, that is correct.

Q. As a result of your tests and your study, do you now have engineering conclusions and opinions with regards to the adoption of certain special rules and regulations for the pool?

A. Yes, I do.

Q. In addition, do you concur with Mr. Nelson's recommendation that the vertical limits of the pool be expanded to include the Grayburg?

A. Yes.

MR. KELLAHIN: We tender Mr. McClelland as an expert witness.

EXAMINER STOGNER: Mr. McClelland is so qualified.

Q. (By Mr. Kellahin) Let's discuss the first

special circumstance you're requesting, and that is a special 10,000-to-1 gas-oil ratio. Give us a general summary of why you're seeking to do that, Mr. McClelland.

A. This request is based off the production performance of the Warren Unit 100. Again, the 100 was the first offset to the discovery well, the 108. The 100 has a capability of producing initially over 2 million cubic feet of gas per day.

Q. Are you surprised by the fact that that well produces gas?

A. This well was a surprise to us, yes.

Q. Is there specific tests on this well to determine that if a higher gas-oil ratio is approved for the pool, in fact, it results in more efficient oil production from the pool?

A. Yes, we have conducted such a test on this well.

Q. And were you able to reach that conclusion?

A. Yes, that is our conclusion.

Q. Let's turn to Exhibit Number 7, then, and identify for the Examiner what you've done in terms of conducting a test on the performance of that well. It's the Warren Unit 100.

A. Yes. If I could on Exhibit 7, Mr. Examiner, I need to correct a typo on that exhibit.

At the very top, you'll see two graphs side by

side on Exhibit 7. These graphs show oil, gas and water production. The typo I need to correct is under Warren Unit 125 San Andres. The title reads "Grayburg San Andres Zone 2". That should be "Grayburg San Andres Zone 1". That is, both the 100 and the 125 are completed in the identical formations.

We -- This graph compares two wells in this pool. Again, on your cross-section, the 100 is the well to the right and the 125 is the well to the left.

In the 100 we conducted a maximum efficient rate type test in June, conducting four different choke-size settings. The GOR testing is shown in the middle graph on this Exhibit 7. As you can see, when we choke back the well in order to produce the rate back -- to try to get back to the 160-MCF-per-day allowable, our GOR escalated over to 250,000 to 1. As we opened the well, our GOR dropped tremendously down to approximately a 10,000-to-1 GOR.

When we opened the well, we realized a rate of over 100 barrels of oil per day at about a 1.6 million cubic feet of gas per day on this well. In addition, when we opened the well, we saw our water cut drop off also.

Q. For the performance of this well, what, in your opinion, is the optimum rate at which it does produce?

A. It's most efficient when we had the choke wide

open on this well. When we pull this well as hard as possible, we get the most oil production at the lowest GOR.

Q. In order to be able to do that for this well, you would need exceptions or modifications of the current statewide depth bracket oil allowable and the statewide 2000-to-1 GOR?

A. That's correct. And keep in mind, this is only for the upper zone in the 100. In this well we have another zone, zone 3, that's capable of producing over 100 barrels of oil per day also.

So yes, this zone alone beats the 80-barrel-a-day allowable, but that's only one of two zones in this well.

Q. Okay. When we look over at the Unit 125 well on the right side of Exhibit 7, what are we seeing here?

A. We're seeing this well's production. These two graphs side by side are on the same scale, so it's a direct comparison.

You'll notice right off that we're not seeing nearly the gas rate that we saw in the 100. The 125 is producing about a 1500 to 1800 GOR, oil rate is in the neighborhood of 65 barrels of oil per day.

The point being, the gas that we're seeing in the 100 is not large in area, that is, it's not present in the 125. Again, these wells are perf'd across the same geologic interval, but we're seeing a drastically different

production profile in these two wells.

Q. Sometimes in reservoirs we have a circumstance where you have a gas cap and you want to preserve the gas energy in that gas cap so you can maximize the oil production. Do you have that circumstance here?

A. We definitely do not have this circumstance here. The two production profiles show that. That is, the 125 is not making the gas rate as the 100. And also comparison of the porosity and the production profiles in the two wells we'll see later, that is definitely not the case. We have a small area of gas pay in the 100 that is not present in the 125.

Q. So placing the 100 at its maximum efficient rate of production is not going to have an adverse consequence on the 125, which is the offsetting well?

A. That is correct.

Q. All right. Let's turn to Exhibit Number 8 and have you identify and describe that display.

A. Exhibit 8 is our production profile of the discovery well, the 108. This well has been on line about 16 months in the San Andres. Again, this is the well that we did extensive testing in, in all four intervals of the San Andres. This well is currently producing San Andres zones 1 and 3.

This well, on average, makes 60 barrels of oil

per day, which is below the depth allowable of 80 barrels of oil a day. But it is a dual completion and, being such, is dually completed with the Drinkard zone. We have production problems on this well that really hamper it producing at a higher rate, which we think it's capable of making.

And again on the 108, you don't see the extensive gas production that we see in the 100. Again, this supports the fact that the gas cap, or the small gas production we see in the 100, is not large in area.

Q. If the Examiner chooses to grant your Application, then, that approval would benefit the performance of the 108 well?

A. That is correct. We still have the Grayburg zone to open in the 108. We anticipate an additional 20 to 30 barrels of oil per day being added through that action.

Q. Let me have you turn to Exhibit Number 9, and let's talk about what your analysis is of the development plan if the rules are not changed, if we stay on the current oil limit and the current statewide GOR.

Describe for us what you're confined to do.

A. Again, to re-emphasize, the current depth allowable for the Grayburg-San Andres is 80 barrels of oil per day, with a limiting GOR of 2000 to 1, which means we're allowed to produce 160 MCF of gas per day. That

would severely restrict the potential of this new discovery.

What we would be forced to do is to drill these wells and complete in San Andres zone 3 only. That would leave San Andres zone 1 behind pipe.

We would anticipate drilling six wells this year, nine wells next year, producing these wells out of zone 3 only to start with. As the wells decline, we would plug back to zone 1 and the Grayburg and produce that interval out. At such time that we could put the two zones together so that it would be below the depth allowable, then we would reopen zone 3.

So in effect, we've got a staggered completion scenario of a three-year development plan to access all pay in this area.

Q. Have you estimated what the additional cost is to the working interest owners and the operator if you're required to confine your development to the current rules?

A. Yes, we have. Just in completion costs alone, we're estimating an additional $900,000 to develop this field under existing pool rules.

Q. Describe for me where the $900,000 estimate comes from.

A. The $900,000 is primarily due to an increase in completion cost. The staggered completions forces us to do

multiple rig-up/rig-downs with the stimulation equipment. We have developed a technique in our area where we can do what we call a stack frac. We pump two fracs in one day. As a result, we have a significant savings in our completion cost.

Q. Let's turn to Exhibit 10, then, and have you contrast what happens under a development plan if the Division approves your Application.

A. Approval of our Application, first off, helps us develop this field in a much more rapid fashion. We're able to go ahead and drill our six wells this year and open not only zone 3 but zone 1 in the Grayburg interval, in combination. We can do this by shortening our completion time, pumping our two stimulations in one day, and basically we're on and off the well with all formations open to production within a few days. This eliminates a need to come back in the well two more times in the future to open new pay and remove plugs and other mechanical work.

This Application also allows us to produce the Warren Unit 100 in its most efficient manner. In fact, it results in more efficient use of the reservoir energy in the Number 100. As we showed, we get a higher -- with higher oil rate, we produce at a lower GOR.

In addition, there's costs and health, safety and environmental exposure risks that we feel are other

considerations upon this Application.

Q. Let's go to Exhibit 11 and look at a similar cross-section that Mr. Nelson used, but that now has the production and testing data on it.

Again, we're looking at the same three wells that Mr. Nelson utilized. He's used -- and you have used the log on the 112 well, but we are showing test information from the 125, as well as the perforations from that well.

A. That's correct. If I may add, we ran a gamma ray in the Number 125 after we cased it, and it correlated directly to this log that we're showing on this exhibit. So the perfs are directly on depth in this exhibit.

This exhibit demonstrates the extensive testing that we've done in this area, to prove up the existence of multiple reservoirs within the San Andres Section. The Warren Unit 108, we did four separate completions, in San Andres zones 4, 3, 2 and 1. Again, zones 4 and 2 we found to be wet, zones 3 and 1 we found to be productive. Also note that we have not yet perf'd the Grayburg on this well.

In the Warren Unit 100, the first offset that's shown on the right of Exhibit 11, zone 3 we IP'd at 145 barrels of oil per day. We produced this zone five months, from November, 1995, through May, 1996, at allowable production.

In May, 1996, we set a plug, came uphole, opened

Grayburg and San Andres zone 1, and then we got our pleasant surprise of strong oil production with the strong gas production also in this well.

Finally, we drilled the 125, the well to the left on the cross-section. In this well, this well was drilled within a few days after we had brought on the 100 and had the strong gas production. So instead of going after zone 3, we wanted to do more testing to either prove or disprove the strong gas production. We completed only in Grayburg and San Andres zone 1 in the Warren Unit 125.

Note, this well is producing approximately 65 barrels a day, but in the 125 we have zone 3 yet to add to production, which we feel will produce over 100 barrels of oil per day also.

All three of these wells again demonstrate the need for the higher oil allowable. The Warren Unit 100 demonstrates the need for the higher GOR, limiting GOR.

Q. I asked Mr. Nelson if he had any geologic reason to either keep the Grayburg and San Andres separate. He said he did not. Do you see any engineering reason to keep the Grayburg separated from the San Andres in this pool area?

A. No, I do not. We are seeing some water production in both zone 3 and zone 1, so there's no engineering need to plug off zone 3 for now, to produce

zone 1, or we would not prematurely water out the one zone over another. Both zones contain water production.

Q. Mr. Nelson also described the fact, in his geologic opinion, there was no geologic reason not to adopt a higher oil rate and a higher GOR for the combined San Andres-Grayburg Pool. Is there any reservoir engineering reason not to -- ?

A. No, there's not. Again, in the 100, by trying to operate this well at current depth allowable, we actually result in waste of reservoir energy, we see our GOR climb tremendously in this well.

Again, fluids are compatible. We'll have a future exhibit to demonstrate this.

Q. All right, let's look at that now while you're describing it. It's Exhibit Number 12. Your conclusion is that the fluids are compatible and you've displayed that on this spreadsheet?

A. Yes, that is correct. We wanted to make certain that San Andres zone 3 and San Andres zone 1 and Grayburg were similar, so we did take oil gravities and gas analysis separately.

And indeed, they are similar. They're both sour, they have gravities in the same range, and the gas content is very similar also in these wells.

Waters are slightly different, but there is no

markedly -- increase in scaling or -- There is no permanent damage that would result from putting these two zones together.

Q. Okay. Let's come back now to a summary on the gas-oil ratio issue. Let's look at the final two exhibits. Let's start with Exhibit Number 13, where you've plotted out the different choke-rate testing on the 100 well.

A. Yes, this is just a -- the MER tests we ran on this well. On the left, on the Y axis, I had gas-oil ratio. On the X axis is our oil rate.

And again it just demonstrates, as we choke this well back, in order to try to keep the well down to an allowable production limit, we see our gas-oil ratio climb tremendously, to over 250,000 to 1.

As we open the well, we get a much stronger oil production, and the gas-oil ratio drops down to a 10,000- to 15,000-to-1 GOR. The point being, it's much more efficient when the well's wide open.

Q. Have you conducted any -- Based upon this data, have you conducted any engineering calculations with regards to the gas-oil ratio in determining the potential extent of the gas zone?

A. Yes, we did. Exhibit 15, the last exhibit in your packet, helps demonstrate this. We ran a buildup test on the 100, as we did another well, the 125.

The buildup on the 100 is very interesting. It helps confirm the fact that it is a limited gas pay interval in this well.

What I've shown in Exhibit 15 is a Horner plot. It's a buildup test. The point of this exhibit is, there's a nearby wellbore boundary that this pressure buildup interpretation identifies. This helps back up the fact that we have a wellbore barrier, be it fault or pinchout -- most likely a pinchout of porosity -- near the 100, that again limits the gas in areal extent.

Q. When we look at the distribution of hydrocarbons within the ultimate limits of what may be the pool boundary, as Mr. Nelson has identified it, do you and he concur on what you believe to be the top of the water of the lowest San Andres formation, that minus-560 number I think he was using?

A. Yes, I am in concurrence with that.

Q. Okay. Summarize for us your conclusions, then, Mr. McClelland.

A. We have an exciting opportunity here in the Warren Unit. We have a new discovery in a field that's 40 years old. It's not often we get to develop reservoirs that have virgin pressure and have good production capability.

Under the current limiting depth allowable and

2000-to-1 GOR, we are severely restricted in how we develop this new reservoir. The current rules require us to slow our development, to spend more money to do so, and increase our mechanical risk over the life of this reservoir.

What we're seeking with the 200-barrel-per-day allowable and a 10,000-to-1 GOR is the opportunity to access all the pay in the wellbore up front, to produce the wells at the most efficient rate, and it helps us maximize our value in this reservoir and also the other working interest owners in this reservoir.

We feel that this request is reasonable and will cause no reservoir waste. In fact, it will actually help the reservoir produce at its optimum capability.

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

Exhibit Number 14 is Mr. Hoover's certificate of mailing of notification. You can find the offsetting operators by looking at Exhibit Number 3, and it shows that the operators adjoining the Warren Unit were notified by Mr. Hoover on June 19th.

With the addition of the certificate and Mr. McClelland's exhibits, we would ask your introduction of what is before you as Exhibits 7 through 15.

EXAMINER STOGNER: Exhibits 7 through 15 will be admitted into evidence at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. In referring to Exhibit Number 11, when you go back into -- I'm assuming it's Conoco's plan to go back into that Warren Unit Number 108 and recomplete into the Grayburg; is that correct?

A. Yes, Mr. Examiner, that is correct. We'll add the Grayburg to existing production in that well.

Q. When you do that in this particular zone, will there be any further stimulation to that Grayburg?

A. Most likely, we will frac that Grayburg again. Our stimulation on zone 1, we had problems, we screened out the frac and we don't feel like we've got a real good stimulation on that well, on the upper zone. So yes, we will open and frac both Grayburg and the existing perfs in zone 1 again.

Q. Okay, just the 1, so what will you do? Put something between the zone 1 and 2 to block that off --

A. Yeah.

Q. -- to limit your stimulation?

A. That's right. Actually, zone 2 is already squeezed. It's zone 1 and 3 in this well that are producing.

Yes, we would set a cast- -- we would set a retrievable bridge plug below the zone 1.

Q. For the future wells in which you're proposing -- or which was proposed in Exhibit Number 4, what will the stimulation program and the perforation program be on future wells?

A. As the plan is right now, zone 3 will be the first completion interval. We will come in -- If you look to the Warren unit 125 -- that's the most recent well we've done -- you'll see that the perfs there are shaded a little differently. Those are the planned perfs we've proposed for that well. That's most likely what we'll go after in each of the new wells in the first completion. Our plan is to perf, frac, set a plug, come up to the Grayburg in zone 1, perf, frac, go back in and clean out and then produce zones 1 and 3 together.

We are still doing some testing in zone 2. That's the other -- We've drilled a couple new wells that have not yet been completed, but we are looking at zone 2 one more time to try to prove up an area in zone 2 for potential production.

But we failed in the 108 in zone 2. We got over 800 barrels of water per day there, but we do have a zone in the log that we want to try one more time.

Q. Now, back when you were talking about the Number 125, you're going down to that zone 3 --

A. Right.

Q. -- and then frac'ing, plugging back, and going into zone 1.

Are you referring to just zone 1, or are you referring also the Grayburg in the first -- in the upper San Andres?

A. You're correct, Grayburg.

Q. Okay.

A. Grayburg and San Andres zone 1 is what I'm referring to.

Q. Okay, I just wanted to make that clear.

A. Right.

Q. I knew what you were talking about by looking, but...

A. Yes.

Q. You're talking about zone 3, zone 1 and -- Okay, so we have that.

Are these three present wells, are they still flowing, or do you have pumps on them?

A. The Warren Unit 100 is flowing. We recently put the 125 on pump within the last week.

Q. Is that a submersible or a jack?

A. No, just on beam pump.

Q. Beam pump.

A. 108 is a pumping well, dual-pumping well, because of the Drinkard completion.

Q. Do you see the other wells as stand-alones, or are they going to be dual with the Drinkard also?

A. No, they're definitely stand-alones. We're out of the dual business.

Q. So those will all be new completions that you're showing -- or that is shown on Exhibit Number 4?

A. That is correct.

If I could update you on Exhibit 4, since we put this exhibit together we have drilled wells Warren Unit 129 and Warren Unit 131, so the southeast quarter of Section 28 has been developed. Now, we have not yet completed the completion operations.

Currently we are drilling Warren Unit 130, which is northwest corner of Section 34. It's down in the bottom of the exhibit. That well is currently drilling today.

Within another six weeks, we will have the other three wells drilled this year that will complete our 1996 development program.

Q. You're referring to 132, 133 and 134?

A. That is correct.

Q. Now, that Drinkard production, that's a fairly old, established production interval, isn't it?

A. That is correct.

Q. And when -- How was this overlooked, and when was it decided to go back in and check it out behind the pipe?

A. I'd like to take claim for it, but I can't, credit for it, but I can't --

Q. Well, since you're here, you can --

A. (Laughter) Yeah, okay.

No, we've always -- Warren Unit development in the Blinebry, Tubb and Drinkard in the past few years has been in Section 28. We see a similar structural high down in the Blinebry-Tubb-Drinkard.

When we were doing 40-acre primary wells over the last two or three years, we kept taking oil on pits, mud-log shows through the San Andres, which led us to our Warren Unit 108 test. So we had mud-log shows, indications, that something was there.

We went ahead and put money in our budget as an exploratory well in the 108 to test the San Andres, did extensive testing to try to prove up or disprove the production capability in the 108 that has led to the current development program.

Q. Was there any -- Did you go back to some of the old completion reports on some of older wells and see if there was any of the same indications there on the drilling logs?

A. There are some mud-log shows in the older wells, yes, but evidently they didn't feel like it was worth stopping and producing it. So it's surprising how it can

happen, but it has happened.

EXAMINER STOGNER: No other questions?

MR. KELLAHIN: No, sir, that completes our presentation.

EXAMINER STOGNER: You may be excused.

Anything further, Mr. Kellahin?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: Does anybody else have anything further in Case Number 11,567?

This case will be taken under advisement.

(Thereupon, these proceedings were concluded at 9:07 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11567, heard by me on 11 July 1996.

, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

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 July 12th, 1996.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998