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. 11,169
APPLICATION OF CONOCO, INC.	)	

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

December 15th, 1994

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Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on Thursday, December 15th, 1994, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, before Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

December 15th, 1994
Examiner Hearing
CASE NO. 11,169

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A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 3:55 p.m.:

EXAMINER STOGNER: Call next case, Number 11,169, which is the Application of Conoco, Inc., for pool creation, special pool rules, and the assignment of a discovery allowable, Lea County, New Mexico.

At this time I'll call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of 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 two witnesses please stand to be sworn at this time?

(Thereupon, the witnesses were sworn.)

EXAMINER STOGNER: Mr. Kellahin?

MR. KELLAHIN: Call at this time David Nelson. Mr. Nelson is a petroleum geologist.

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, would you please state your name and

occupation?

A. My name is David Nelson. I'm a geological advisor with Conoco, Incorporated.

Q. Where do you reside, sir?

A. I live in Midland, Texas.

Q. On prior occasions have you qualified as a geologic expert before this Division?

A. Yes, I have.

Q. Summarize for us, Mr. Nelson, what has been your involvement with the area that we have identified for purposes of this hearing as the North Hardy Tubb-Drinkard Pool.

That's at least our request for a name, and that's the way I've learned this area, so what has been your involvement in this area?

A. Well I've been the geologist involved with the drilling of an exploratory prospect on the Hardy 36 State lease, have been involved in geological studies of that lease since the drilling of the discovery well.

Q. What additional technical experts with your company have worked with you in evaluating the opportunities available to you in the Hardy 36 State Number 3 well?

A. Damian Barrett, reservoir engineer, has worked with me on this project since its beginning.

Q. Collectively, have the two of you now reached certain conclusions and recommendations for the Division concerning how best to establish a pool, including the horizontal and vertical limits, and within that pool interval, what special rules, if any, to apply to this production?

A. Well, we have -- We would like to combine the Tubb and Drinkard formations into one pool. We'd like to apply the special pool rule of the limiting GOR of 10,000 standard cubic feet per barrel to the new pool and to obtain a discovery allowable of 186 barrels of oil per day for the Hardy 36 State Number 3 well.

Q. What kind of acreage-size spacing do you propose for the spacing and proration units for the well?

A. We propose 40-acre spacing.

Q. All right. Anything else within that proposal in terms of the kinds of rules you're suggesting?

A. No.

MR. KELLAHIN: All right. We tender Mr. Nelson at this time, Mr. Examiner, as an expert geologist.

EXAMINER STOGNER: Mr. Nelson is so qualified.

Q. (By Mr. Kellahin) Let me have you turn to the first display, and let's look at that portion of the log of the Hardy 36 State Number 1 well that you have as your potential discovery well in the Tubb-Drinkard Pool.

A. Okay.

Q. All right? You can either start at the bottom and work up, or start at the top and work down. You choose.

A. Okay, this is a type log. It's a composite of several intervals within the Hardy 36 State Number 1 well. This well is a new-field wildcat. It has resulted in a multiple zone discovery.

Q. How many potential zones do you have that may be productive in this wellbore?

A. Well, we have as many as 10 potentially productive zones in this well.

Q. What -- To fill in some of the details that are a corollary, if you will, to our particular Application, refresh the Examiner's memory as to what has been accomplished with regards to the Simpson portion of the productivity in the well.

A. Well, to date there are four formations which have been proven productive. The Simpson formation is one, and it is presently producing in this well.

The Ellenburger has also been tested in the well but found to be too thin and the rates not sufficient for commercial production.

The Tubb and Drinkard have been tested on the lease. The Drinkard has been shown to be productive from

this wellbore and an offsetting well, the Hardy 36 State Number 3.

Q. All right, the offset Hardy 36 State Number 3 is the discovery well in the Simpson portion -- No? Backwards.

A. This well, the Hardy 36 State Number 1, is the discovery well for the Simpson.

Q. Okay. What is to be the discovery well for the Tubb-Drinkard?

A. The discovery well for the Tubb is the Hardy 36 State Number 3, and we have not designated a discovery well for the Drinkard.

Q. All right. So it would be the State 3 well that would be the beneficiary of any discovery oil allowable attributed to the Tubb?

A. That's correct.

Q. Okay. So the Examiner can have a sense of where you're going with your presentation, Mr. Nelson, let's have you identify on the log what you propose as the top portion of the Tubb-Drinkard Pool, as defined on the log of this well.

A. Okay, as defined on this log, the top of the Tubb occurs at a depth of 6308 feet, and we propose that the Tubb-Drinkard Pool include the Tubb and Drinkard formations from 6308 in this well to a depth of 6886, which is the top

of the Abo and base of Drinkard.

Q. Okay. Having identified the proposed vertical limits, let's have you turn and identify for the Examiner how the Division has handled this kind of production within this area. If you'll look at Exhibit Number 2, identify that for me.

A. Exhibit Number 2 is a map of the Drinkard formation showing all the wells which have produced from the Drinkard in the area.

I've shown the Hardy 36 State new wells, three of them, in Section 36, and the offsetting pools by name, which include the Hardy Tubb-Drinkard Pool to the south, the Weir Drinkard Pool to the north, the Skaggs Drinkard Pool also to the north, and the Warren Drinkard Pool to the east, and the Drinkard Pool proper lies to the southeast.

Each of these pools has a GOR of 10,000 standard cubic feet per barrel or 6000 standard cubic feet per barrel. The Warren has a limiting GOR of 8000 standard cubic feet per barrel.

Q. As a geologist, do you have an opinion whether or not the Drinkard portion that is shown to be productive within the wells in Section 36 constitutes a separate source of supply that is separated from any of these other Drinkard pools?

A. Yes, sir, I have conducted geological studies and

determined that the Drinkard Pool and the Hardy 36 State discovery is isolated from the offsetting pools.

Q. And you've got some geologic displays that illustrate that later in your testimony?

A. Yes, I do.

Q. All right, let's turn to the Tubb. Show the Examiner what your investigation shows with regards to the relationship of Section 36 to any other Tubb formation that may be declared as a pool in this area.

Q. Well, surrounding the Hardy 36 State discoveries are Tubb producers, as shown on this map. All known producers from the Tubb formation are shown here.

The pools that are included on the map are the Monument Tubb Pool to the north, the Hardy Tubb-Drinkard to the south, and the Tubb Oil and Gas Pool to the southeast. The Warren presently includes Blinebry and Tubb as the Warren Blinebry-Tubb Pool.

Q. All right. Let's turn to some of your geologic displays. Let's look at the Drinkard first. If you'll unfold that Drinkard structure map, it's marked as Exhibit Number 4.

Pretty snazzy colors, Mr. Nelson. What's the color code?

A. Well, this map of the Drinkard shows the geological structure on top of the Drinkard formation.

It's a color contour map, and the contour interval is 25 feet.

Q. All right. What's the color code mean?

A. Well, each contour of 25 foot has a change of color value. Structural highs are accentuated this way, graphically, and it shows the structural highs and lows that surround the Hardy 36 State lease.

Q. All right. Without yet looking at the cross-sections, identify for us the marker wells, if you will, that helped you conclude that the Hardy wells in 36 were discovering a separate Drinkard source of supply that is distinguishable from any other existing pool.

A. The Hardy 36 State lease is a four-way closed structure. It's surrounded by wells which have been drilled in structural lows, which define those lows. Those are shown in the -- The lows are shown as blue colors on the map.

These include wells, the HH-2 which is to the southwest of the lease, the Alexander 1 which is to the southeast, and to the north the Semu 82 Well.

These are well-defined structural lows and are well-defined structural highs on which the Drinkard production is localized.

Those structural highs to the north include the Weir Drinkard, the Warren Drinkard over to the east, the

Drinkard Pool proper to the south, and the Hardy Tubb-Drinkard to the southwest.

Q. Geologically, are there differences that you perceive between this Hardy 36 State Drinkard and any of the other Drinkard reservoirs in this area?

A. Well, there are actually a lot of geologic similarities of these pools, but in terms of structure they are indeed isolated from one another.

Q. All right. It's the structure that has isolated the Drinkard?

A. That's correct.

Q. But once you get within a structure, the Drinkard in one Drinkard reservoir is very much like it in the other Drinkard reservoirs in the area?

A. That's correct.

Q. All right. Let's turn to see what the Tubb looks like. If you have a Tubb structure map --

A. Yes, I have a Tubb structure map, which is Exhibit 5.

Q. All right. For purposes of the Tubb, show us what has caused you to believe that the Tubb is a separate and distinct supply from any other Tubb pool.

A. This map on the top of the Tubb again shows the structural highs that occur in the Warren area and the Weir area to the north, and the Hardy Tubb-Drinkard to the

southwest, and the Tubb Pool proper, which is to the southeast.

Each of these are isolated highs. Geologically, these pools are -- these maps look the same because there's no stratigraphic changes that occur between the top of the Tubb and the top of the Drinkard. So the isolation that we see in the Tubb is very similar to that which we see in the Drinkard.

There are well-defined structural lows that flank the Hardy 36 State lease in the closure that is mapped there.

Q. Is there any reasonable geologic probability that your Hardy State area is simply a southeastern extension of what is known as the Monument Tubb Pool?

A. Well, we think there is indeed, a four-way closure on the Hardy 36 State lease.

Q. Okay. So that's not an issue in doubt?

A. No.

Q. You're satisfied you have enough detail that supports your conclusion that you're separating the Hardy State Tubb from the Monument Tubb to the north?

A. Yes, that's right. From a geological perspective, these structures are all isolated from one another.

Q. All right. Having reached the conclusion that

these are each separated horizontally from other similar formations, describe for us your geologic argument for combining these two into one pool.

A. Okay. May I turn to the cross-section to do that?

Q. Sure, let's do that.

A. My cross-section will go from the southwest to the northeast, and it's marked on this -- on the maps as cross-section A-A'.

Q. All right. A-A' is going to be Exhibit Number 6?

A. Yes, sir.

Q. All right. Let's take a minute and unfold these things. They rattle a little bit.

A. Okay, for orientation, this cross-section A-A' has -- on the left is the southwest, and on the right is the northeast.

Q. All right.

A. In the northeast area, I'm showing wells from the Warren Blinebry-Tubb and Warren Drinkard Pools.

Q. All right. Let's find those now. On one of the structure maps we can find those off to the east of the Hardy State area, can we not?

A. Yes, it goes right across the structure, the closed structure in Section 28.

Q. All right. Let's start with the Warren Blinebry-

Tubb area. That includes the Drinkard over here on the far right?

A. Yes.

Q. Help us read the color code so we know where the Tubb is and where the Drinkard is.

A. Okay, I've used the color on the map to identify the vertical thickness of the formations so that the Tubb shown here is between the Tubb marker and the top of the Drinkard, and its color is purple, or blue, depending on how you see that color.

Q. All right, I see it as a purple. So what I see as purple is the Tubb portion?

A. It is Tubb formation.

Q. Now, how do I find the Drinkard formation?

A. The Drinkard immediately underlies the Tubb. It's in sort of a gray stipple pattern.

And within the Warren Drinkard I've identified what is the vertical extent of the Drinkard reservoir. It's in green.

Q. All right. Now what's the relationship between the gray stippled area and the green?

A. Yeah, that -- The green area is the area of Drinkard pay development.

Q. Within the Drinkard formation?

A. Within the Drinkard formation.

Q. So you have Drinkard formation above and below the green area?

A. That's correct.

Q. But the green area is the pay interval of the --

A. Is the pay interval.

Q. Describe for us the relationship, then, of those two pay portions, the Tubb and the Drinkard, in this Warren area.

A. Okay. Within the Warren area I will address the Drinkard first.

We have identified an oil-water contact which occurs at a depth of minus 3250 subsea, and the top of the pay interval occurs at the top of the Drinkard porosity, which is -- that porosity interval is in the lower part of that Drinkard formation.

Q. In the Warren area are the Drinkard and Tubb formations being produced as one pool?

A. In the Warren area, the Drinkard and Tubb are not one pool; they are two different pools.

Q. Okay.

A. We have the Warren Drinkard Pool and the Warren Blinebry-Tubb Pool in that area.

Q. Okay, let's take ourselves to the left on the cross-section, to that portion of the display that shows Simpson discovery, Tubb discovery, that portion.

A. Okay.

Q. Okay, let's look at the logs of the Hardy 36-1, -7 and -3.

A. Yes, there are three wells shown here, the Hardy 36-1, which is the type log shown earlier, the Hardy 36 Number 7, and the Hardy 36 Number 3.

The Hardy 36 Number 3 is the discovery in the Tubb as it was drilled as an offset to test the Drinkard and the Tubb intervals, and we have proven production from those two formations.

Q. From a geologic perspective, what do you see to be the benefit for combining the Drinkard and the Tubb into a single pool for this Hardy area?

A. Our studies and testing of the Drinkard reservoir within the Hardy lease have shown also an oil-water contact there, which occurs at a depth of minus 3295, compared to that 3250 subsea vertical depth that occurs in the Warren Drinkard.

Q. You're what? 35 --

A. We are 45 foot --

Q. -- 45 feet higher than in the Hardy with the water-oil contact?

A. That's correct.

Q. So why does that matter?

A. Well, that helps us establish that these pools

are isolated, they have different oil-water contacts.

Further, the top of the porosity in the Hardy area is at lower structural elevation, and that makes the interval of pay development within the Drinkard and the Hardy area much thinner.

Q. Mr. Barrett's going to testify and tell us that he anticipates that the Drinkard portion in the Hardy area is really going to be a marginal producing formation.

Geologically, do you find geologic evidence that supports his engineering conclusions about the fact that this Drinkard is going to be marginal in the Hardy area?

A. Yes.

Q. What do you see that supports that?

A. As you can see on this cross-section, that the thickness of that pay interval is much thinner than it is in the Warren area, and we have perforations that are in the Drinkard formation below that oil-water contact, and we have produced a large quantity of water when we are beneath that oil-water contact.

Q. From a geologic perspective, do you see any reason to keep the Tubb and the Drinkard separated if the Division creates a new Hardy pool?

A. Geologically, these formations are similar in terms of their structure and their -- and the stratigraphy, the thickness of the formations, does not change across the

area. The -- Both pools are isolated structurally, and this is true as well in all the offset fields which we've studied.

I would note that while we see an oil-water contact in the Drinkard formation, there is not one that we know of in the Tubb formation.

Q. All right. So we're not at risk of combining an upper oil zone that's got a water component to it with a lower oil zone?

A. That's right.

Q. All right.

A. We see only one oil-water contact.

Q. And that is in the lowest of the two formations?

A. That's correct.

Q. All right. Let's take a quick peek at the B-B' cross-section, which is -- Oh, you don't have it? All right. We do have that available if the Examiner desires to see it, there's an additional cross-section.

But you're satisfied that based upon your geologic studies, that the separation of both the Tubb and the Drinkard in this Hardy area is geologically valid from any other current pool?

A. Yes.

Q. And you see no geologic reason not to combine those two formations into a single pool?

A. That's correct.

MR. KELLAHIN: All right. That concludes my examination, then, of Mr. Nelson.

We move the introduction of his Exhibits 1 through 6.

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

EXAMINATION

BY EXAMINER STOGNER:

Q. Where did you get that lower water-oil contact on that Hardy 36 Number 1 well?

A. Yeah, the Hardy 36 Number 1 is mapped at 3295 subsea vertical depth.

Q. Okay, so that lower portion of the green?

A. Yeah, the base of the green is the oil-water contact.

Q. Now, you didn't have the Tubb tested -- The Tubb was tested in the Number 3 well, but not the 6 -- I mean not the 7 or 1; is that correct?

A. That's correct. We have not opened the Tubb in either of those other two wellbores.

Q. Now, which test came first? The Number 1 or Number 3 well in the Drinkard?

A. In the Drinkard, the Number 3.

Q. And how much longer was it that the Drinkard in

the Number 1 was tested?

A. How long was it after?

Q. Right.

A. It was a matter of a few months. We tested the Drinkard in Number 3 first in -- I would say around mid of 1994, and we've tested the Drinkard in the Hardy 36 Number 1 after that time. I don't have exact dates.

Q. Okay. Were those perforations squeezed at that point in the Number 1?

A. No, the Drinkard perforations are open presently for production in Number 1.

Q. I thought you said it was presently producing on the Simpson.

A. Well, it is. It's a dual completion.

Q. Oh, dual, okay.

Have you been in contact with our geologist in the Hobbs District Office, Mr. Paul Kautz, concerning this matter?

A. Yes, I have.

Q. And I was curious why you didn't go through the regular nomenclature procedure, other than just getting the 10,000-to-1 GOR.

A. Well, that -- I guess the purpose of coming to hearing was primarily to get the special pool rule.

Q. For the 10,000 to 1?

MR. KELLAHIN: That's right, Mr. Examiner. We could have gone either way, and it was our choice, I guess, to ask that you consider not only the GOR but the creation of a pool.

However, we do have a letter approved by Mr. Sexton as to the District's position with regards to this combination --

EXAMINER STOGNER: Have you got that included?

MR. KELLAHIN: Yes, sir, it's coming up.

EXAMINER STOGNER: Okay, I'll wait till that, then.

Q. (By Examiner Stogner) When Conoco drilled those Hardy wells, what was its primary objective?

A. The primary objective in the Number 1 was to test the Ellenburger and Simpson prospects. We had recognized that all along potential for multiple producing horizons on the lease.

Q. So that well was essentially -- well, in mind to check all the formations --

A. That's correct.

Q. -- that you suggested in your Exhibit Number 1?

A. That's right.

EXAMINER STOGNER: I have no other questions for the geologist at this time. I may later on after I hear --

MR. KELLAHIN: All right, sir.

EXAMINER STOGNER: -- the testimony of the other witness.

MR. KELLAHIN: All right. Then at this time, Mr. Examiner, we'll call Mr. Barrett.

(Off the record)

MR. KELLAHIN: We would call, Mr. Examiner, Damian Barrett. Mr. Barrett is a petroleum engineer.

DAMIAN G. BARRETT,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. For the record, sir, please state your name and occupation.

A. Damian Barrett. I'm a reservoir engineer for Conoco.

Q. Mr. Barrett, you've testified before the Division in a prior hearing. It had to do with the Warren properties to the east of this particular location, did it not?

A. Yes.

Q. In addition, you are continuing your engineering responsibilities for your company and you have made an engineering study of the performance of these Hardy State wells?

A. Yes, I have.

Q. And based upon that study, you now have engineering conclusions about establishing some regulatory rules for the management of that resource?

A. Yes, I do.

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

EXAMINER STOGNER: Mr. Barrett is so qualified.

Q. (By Mr. Kellahin) Let's talk about how you and Mr. Nelson have decided you would like to go about developing the Hardy State properties.

You've got the log of the Hardy State 1 well that shows potentially 10 different zones that can be produced in this immediate area. You've already set in motion combining the Ellenburger and Simpson as one pool.

Have you met with the District Office, Mr. Sexton's geologist, Mr. Kautz, and the combination of the Ellenburger and the Simpson is a combination that's acceptable to the District?

A. Yes, we have.

Q. All right. When we come back up to the Tubb and the Drinkard what choice have you made about that resource?

A. The same in combining the Tubb and the Drinkard.

Q. What do you see to be the benefit of doing so?

A. The benefit of combining the Tubb and the

Drinkard is, the Drinkard looks to be marginal and uneconomic to produce by itself, and we need to produce it with the Tubb.

Q. All right. You've run various economic scenarios which we'll see in a moment. It goes through the process of looking at single completions, dual completions and what amounts to the equivalent of downhole commingling of the Drinkard and the Tubb?

A. Yes, I have.

Q. And the only viable economic one is the combination of those two pools -- or formations into one pool?

A. Correct.

Q. All right. Let's look at Exhibit 7, then, and show us what your plan of development is going to be.

A. Okay, in Exhibit 7, this is the development plan for each 40-acre unit.

What we have seen so far in the Number 1, the type log that you've seen already, is that the Ellenburger, we have tested that, and it has good potential for some production. The Simpson, we are producing it currently.

We right now are testing the Strawn in our Number 7 well. We will test the Abo next in our Number 7 well. And that's one potential development scenario that we have, is a dual that we would combine all four of those

formations. So that's number one in this exhibit.

Then number two, we have already -- we are producing the Drinkard and we are also producing the Tubb. We have yet to test the Blinebry and the Glorieta. We have -- It was mentioned, I worked the Warren unit also. We have a commercial discovery on the Warren unit and the Glorieta, and it looks equally as commercial here. So that would be -- number two would be our next development scenario for another wellbore, and that would be a dual wellbore.

The third would be a San Andres test, again, on the Warren unit; we're testing that right now. And then there's also the Grayburg, so that would be another wellbore.

Then we already have existing Lynx wellbores there in the Eumont.

Q. Well, the challenge for you as an engineer, then, is to figure out how you can maximize recovery of hydrocarbons from all these multiple zones with the fewest number of wellbores?

A. Correct.

Q. All right. The plan, then, insofar as the Drinkard-Tubb goes, is to see if they will be combined into one pool?

A. Correct.

Q. What is your engineering conclusion about combining those two as one pool? Any problem?

A. No.

Q. Do you see any opportunity for waste?

A. If we don't combine the Tubb and the Drinkard, I see opportunity for waste.

Q. All right. Let's see what's happened in some of the other similar type reservoirs in this area when it comes to the Tubb production.

If you'll look at Exhibit 8, first of all tell us how to read the display, and then show us the conclusions.

A. Do you have Number 8 as the Tubb or the Drinkard?

Q. I have -- Okay, 8 is Drinkard?

A. Okay.

Q. All right, I'm the only one that's got it different. I'm sorry, 8 is the Drinkard. Let's look at that.

A. Okay, what we have here is a probability plot that has the different pools that Mr. Nelson talked about earlier on his structure maps. And what this is showing is each of those pools, their cumulative GORs and how they trend for the different wellbores that are in those pools.

And you can see on the 50-percent probability line, that is what a typical well would be in these pools. And there's a vertical line on the plot as well at the

10,000 GOR point, and those two would intersect, showing that a typical well is typically producing at a 10,000-to-1 GOR.

Q. So what's the issue? Statewide rule start you off at 2000 to 1?

A. Correct?

Q. Why is that a problem?

A. We're just showing that most of them are producing at a 10,000-to-1 GOR and that a 2000-to-1 GOR is too low.

Q. So when we see data subsequently that the performance in the Hardy State area shows gas-oil ratios higher than 2000 to 1, it's no surprise --

A. Correct.

Q. -- that we're seeing Drinkard production in this area that on average is in this 10,000-to-1 rate?

A. That's right.

Q. All right. What do we look at when we see the Tubb production in terms of analogous GORs, Exhibit 9?

A. On Exhibit 9, showing the Tubb production, you have basically the same kind of results, again, showing the similarity of these two pools on these different leases, or in these different pools, and how again their GORs for a typical well is in the 10,000-to-1 GOR range.

Q. What kind of reservoir are we dealing with in

terms of drive mechanism?

A. These are solution gas drive reservoirs.

Q. As to both the Drinkard and the Tubb?

A. Correct.

Q. Okay. You've said the Tubb Oil Gas Pool is a gas reservoir. What do you mean?

A. That is the data that is on there that is in the red, and with that you see that typically those GORs are a little bit higher, and that is because it is a gas reservoir, more of a gas reservoir.

Q. All right. One of the things I think you as an engineer look at is to see if there's a relationship between high GOR and structural position in the reservoir. Have you examined that?

A. Yes, I have.

Q. What's your conclusion?

A. If I can refer you to Exhibit Number 10, I have several of those instances listed here, and I find that the reservoirs are highly variable with regards to structure and GOR.

You can find a well high on structure that has either a high GOR or a low GOR in either situation.

Q. So what does that tell you as an engineer?

A. That you can't always be certain that all of your wells are going to have the same GOR, depending on where

they're located structurally.

Q. Okay. It also tells you, does it not, that you don't have a classic gas cap in your reservoir where you need to manage, if you will, the gas withdrawals, because that high gas production is at the top of the structure?

A. That's correct.

Q. Okay. You don't see that kind of creature here then?

A. That's right.

Q. All right. Exhibit 11, what is this?

A. Exhibit 11 is the economics that I've run on these different scenarios for the Hardy 36 State lease. I have used the actual results that we've received from these wells that we've opened up in these different zones and have run economics on those rates showing for a Tubb single $913,000 net present value to drill and complete that well; for a Drinkard single it has a negative $156,000 net present value.

Dualing the two zones, you have $872,000 net present value.

When you combine both the Tubb and the Drinkard into a single wellbore, you have the highest net present value, $1.2-million net present value.

Q. The Drinkard by itself is not a good idea?

A. Correct.

Q. It's a negative number. And to combine the two as a single completion, then, provides the best economic incentive?

A. That's correct.

Q. Apart from the economics, do you see any reservoir condition that should preclude the commingling or the combination of the two intervals into one pool?

A. No, I don't.

Q. All right. Let's look at Exhibit 12. What are you displaying here?

A. On Exhibit 12 I have PVT analysis and comparisons. What I've done here -- This is primarily to show that all of these reservoirs, as well as offsetting reservoirs in these pools, are a solution gas drive.

Their original pressures are all similar, within a range from 2600 pounds to 2700 pounds, roughly. Bubble-point pressures are in a range of 2300 to 2600 pounds. Initial GORs are all similar, within a range of 900 to 1100. And gravities are also within a similar range of 38 to 40 degrees.

Q. Okay, what's the point?

A. Well, the point -- There's a couple points here. On the Hardy we have taken these pressures, they are showing original reservoir pressure, which we know the offsetting pools are not at original reservoir pressure, so

again showing isolation.

The other point is that solution gas drive -- with a solution gas drive reservoir, you can go ahead and produce them at a higher GOR, and you're not going to waste any of your reservoir fluids.

And again, this is to show that there are similar reservoirs, that we're all looking at similar reservoirs.

Q. In order to forecast what your Hardy State wells are going to do, how they're going to perform, have you looked for an analogy in this area to find what you would characterize to be a typical Drinkard-Tubb well so you could see what that well does over the life at least of enough performance so you can forecast something?

A. Yes, I have.

Q. All right, let's look at Exhibit 13. It's identified as the Britt B 10 Tubb?

A. Correct.

Q. What does that mean?

A. This is primarily looking at the Tubb formation, and this well was drilled in the middle of 1960, and this is the analogy well. It was drilled right after the discovery Britt well.

Q. And where is this well going to be located?

A. This well is located -- you can -- in the Monument Tubb Pool. It's also evident on the structure map

that was shown earlier. I also have the PVT analysis on the previous slide.

Q. All right. So when we look at the Britt 10 well, that's Tubb production, and you want to see what that well has done so you can have some idea of at least how the Tubb would perform on the Hardy State wells?

A. That's correct.

Q. All right. Let's look at 13 and have you tell us what's happened with the Britt 10.

A. Okay, with the Britt 10, again, this was right in conjunction with the discovery well. It was brought on as an allowable oil well of 61 barrels a day, and you can see that production was steady. That is in the top part of the chart.

The middle part of the chart is the gas-oil ratio, and you can see that increasing about 22 months after it was first brought on line to roughly a 5000-to-1 GOR.

And then in the bottom part of the chart you can see the bottomhole pressures. At the same point in time that the GOR increased to about 5000 to 1, the bubble-point pressure was reached in the reservoir. So we had dropped below the bubble-point pressure, which that's an indication that you again have a solution gas drive reservoir and that your GOR is going to increase.

Q. Okay. With this analogy in mind let's look at the test information on Exhibit 14 for the Hardy State wells.

A. All right.

Q. Turn to that display, and let's talk about the Number 3 well first.

A. Okay. On the Number 3 well, we have the Drinkard formation that we tested earlier on. More marginal rates. We made a lot of water on that well because we perforated it below the oil-water contact there. We had a reasonably high GOR, 4700 GOR, on that well.

The Tubb, we then came up and tested the Tubb and have -- This is where we're asking for our discovery allowable. It's currently making 184 barrels of oil per day, 208 MCF, with an 1100 GOR. And again, the bottomhole pressure is showing that that's original reservoir pressure, or virgin reservoir pressure.

Q. Okay, and then drop down and look at the Number 1 well. That's your Drinkard test?

A. Correct.

Q. And what did it do?

A. It made 6 barrels of oil per day, 336 MCF, 4 of water, with a GOR of 56,000, which is quite high. Again, virgin reservoir pressure on the bottomhole pressure.

Q. All right. If you'll pull out Exhibit 12 again,

and let's make some comparisons between Exhibit 12 and Exhibit 14. First of all, on Exhibit 14 when you look at both the 3 and the 1 well as to the Drinkard production, that really is marginal, if you will?

A. Correct.

Q. That's not going to be your primary zone of recovery?

A. That's right.

Q. When you look at the Tubb production, you're already looking at producing gas-oil ratios that are significantly higher than 2000 to 1, right? On the Drinkard?

A. Yes, on the Drinkard.

Q. All right. When you look on Exhibit 12 and find the original pressure plus the bubble-point pressure, where are we in the Drinkard in terms of approaching the bubble point of the reservoir?

A. We're very close to that.

Q. All right. As soon as the Drinkard production in either or both of these wells hits that bubble point, what happens to the GOR?

A. The GOR increases.

Q. It's going to take off, isn't it? It's going up?

A. That's right.

Q. All right. So you've got that problem to deal

with?

A. That's right.

Q. Now let's take a look at the Tubb. Where were you in the Tubb? You are still producing above the bubble point at this time?

A. That's correct.

Q. And that producing GOR is what? 1000, 1100 to 1?

A. Correct.

Q. All right. The original pressure in the Tubb, in the Hardy State Number 3, is 2652, and the bubble point is 2530. So how long is it going to take you before you hit bubble point in the Number 3 well and the gas-oil ratio climbs for the Tubb production?

A. From my estimates, we've got about four more months before that happens.

Q. All right. Once that happens, what do you forecast to be the appropriate gas-oil ratio at which to produce the pool?

A. At that point in time, from our Exhibit Number 13, they were showing a 5000-to-1 GOR for just the Tubb alone at that point in time.

If you combine the Drinkard, which has a high GOR also, you could be approaching close to 10,000-to-1 GOR, even at that point in time.

Q. At this point in time, for the Hardy State wells,

if we combine the Tubb and the Drinkard, what's your expectation of the gas-oil ratio now?

A. Right now, it's at about 4000 to 1.

Q. All right. And then in another four to six, maybe eight months, you're going to be up to 10,000 to 1?

A. That's right.

Q. And that's why you're asking for 10,000 to 1 now?

A. That's correct.

Q. Does the increased GOR have anything to do with increasing the oil recovery?

A. Yes, it does.

Q. Describe for us how that might happen.

Q. Well, what we've seen so far is that typically whenever we have to pinch back on a well to keep it below its limiting GOR, that we drop oil production in that process.

Q. Okay. Let's turn to the calculation of the discovery allowable for the Number 3 well. If you'll look at Exhibit 15, let's have you quickly go through that calculation.

A. Okay, that calculation is 5 barrels of oil per day for every foot of depth, times the depth to the top perforation, divided by 730 days. That quantity is in addition to the depth allowable.

We've got a top perf of 6423, a depth allowable

of 142 barrels a day, and that calculation gives us 186 barrels of oil per day.

Q. Does the Hardy State 3 well have the capacity to produce in excess of the top 40-acre allowable of 142 barrels a day?

A. Yes, it does.

Q. All right, so it could enjoy or benefit from the discovery allowable?

A. Yes, it could.

Q. All right, let's go on to Exhibit 16. What's the purpose of this exhibit?

A. The purpose of this exhibit is -- To obtain the discovery allowable, you need to make sure that the mixing of the different gravity oils does not cause a deduct. So I've run through those calculations and have found that there is no deduct when we combine these two oils.

Q. All right, sir, let's look at Exhibit 17. Identify and describe what you're showing here.

A. This is a water analysis compatibility, taking water analysis on both the Tubb water and the Drinkard water, and checked them for a scaling tendency in different ratios of waters, and have found that there is basically no scaling tendency with these waters.

Q. You've gone out, investigated and looked for possible problems as an engineer that would preclude the

combination, and you simply don't find any reason to preclude the combination of the two formations?

A. That's correct.

Q. Let's turn now to the subject we've touched on several times, and that is the position of the District Office of the Oil Conservation Division under the direction of the supervisor, Mr. Sexton.

Without reading the letter, tell us what the letter purports to say, and then the second page is Mr. Sexton's signature underneath Mr. Hoover's signature.

A. Okay. In November, Mr. Nelson and myself and Mr. Hoover went to talk to Mr. Sexton and Mr. Kautz to ask them about the creation of a new pool combining the Tubb-Drinkard on the Hardy lease, as well as the possibility of obtaining the discovery allowable, and also to create a new pool, which combines the Simpson and the Ellenburger formations.

Q. All right. The combination of the Simpson and the Ellenburger is taking a different regulatory-processing route, but there is approval from the District to let that happen, I believe, through their nomenclature proceedings?

A. Correct.

Q. And the starting date for the discovery oil allowable credits for the Hardy State 3 well is to be what date, Mr. Nelson -- I mean, Mr. Barrett?

A. August 19th, 1994.

Q. All right. And you and Mr. Nelson described the combination of the Tubb and Drinkard for Mr. Kautz and Mr. Sexton, and we have their agreement as to that?

A. Yes, we do.

Q. Did they express any objection to establishing a gas-oil ratio of 10,000 to 1?

A. No, they didn't.

Q. All right. Let's look at the parties that received notification of this proceeding. If you'll turn to 19, describe for us what that shows.

A. This is a map showing the Hardy 36 State lease in the middle, with the stippled area showing where we propose this pool to include, and it also shows the offsetting operators within the mile radius of that area.

Q. Based upon that information, was notification of this Application sent to all those interest owners?

A. Yes, it was.

Q. And on Exhibit 20, do we have a list of the names and addresses of those companies, stapled to that, then, the copies of the green return receipt cards?

A. Yes, we do.

Q. Are you aware of any opposition to having the Division approve this Application?

A. No, I do not.

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

We move the introduction of his Exhibits 7 through 20.

EXAMINER STOGNER: Exhibits 7 through 20 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Barrett, looking at Exhibit Number 15, top perforation of 6423, I hate to be nit-picky but is that from the Kelly bushing, or is that from ground level?

A. That is from ground level.

Q. And what is significant about the August 19th date?

A. That's the date of first production from the Tubb formation.

Q. In the -- In which well?

A. In the Number 3 well.

Q. In the Number 3 well.

This is a lot of information to assimilate through here in such a short time. Bear with me.

A. Sure.

Q. And it could be assumed what you're showing me on that Exhibit Number 9 and your Exhibit Number 8, cumulative GOR, and also there was a couple of maps presented earlier,

Exhibit 2 and 3, kind of a similarity of what other pools' GOR limit is at 10,000 to 1 in this particular area in either the Tubb and/or Drinkard, with a typical well having a 10,000-to-1 GOR; is that correct?

A. That's correct.

Q. And that has been the set GOR in, essentially, a bunch of the surrounding pools?

A. That's correct.

Q. And how about the special pool rules for the GOR? What would be the established date for that?

A. The same, August 19th.

Q. August 19th. So you want the whole special rules retroactive back to August 19th?

A. That's correct.

Q. And if that wasn't done, what would be the -- what would be the outcome?

A. If it weren't done we would basically discontinue development of the Drinkard at this time, and there would be waste.

Q. If you wouldn't get retroactive --

A. Oh, I'm sorry, different question.

Q. That's pretty --

A. Yeah, I'm sorry.

MR. KELLAHIN: You're going to be subject to shut-in --

THE WITNESS: Yeah --

MR. KELLAHIN: -- or curtailment, aren't you?

THE WITNESS: -- right, we will be, we will be curtailing.

Q. (By Examiner Stogner) Just the Number 3 well?

A. Also the Number 1 well.

Q. Okay. Now, the Number 7 has not been perforated in the Tubb-Drinkard interval, has it?

A. Not yet.

Q. Okay.

A. We're just now working on the Strawn in that wellbore.

EXAMINER STOGNER: I have no other questions of the other witness at this time.

MR. KELLAHIN: All right, sir.

EXAMINER STOGNER: Mr. Kellahin, I will -- Let me see, I have my plate kind of full. Could you provide me a rough draft order?

MR. KELLAHIN: I'd be happy to, Mr. Examiner, certainly.

EXAMINER STOGNER: And with that, I'll take Case Number 11,169 under advisement.

(Thereupon, these proceedings were concluded at 4:52 p.m.)

* * *

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 December 28th, 1994.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11169, heard by me on 15 December 1994.

, Examiner
Oil Conservation Division