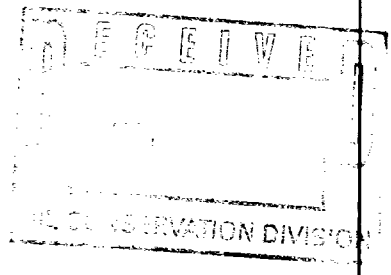
STATE OF NEW MEXICO

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.

CASE NO. 11,241

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

April 6th, 1995

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on Thursday, April 6th, 1995, 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

April 6th, 1995
Examiner Hearing
CASE NO. 11,241

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E X H I B I T S

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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 11:30 a.m.:

EXAMINER CATANACH: All right, at this time we'll call Case 11,241.

MR. CARROLL: Application of Conoco, Inc., for an unorthodox gas well location, Eddy 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 one witness to be sworn.

EXAMINER CATANACH: Are there additional appearances?

MR. COOTER: Paul Cooter with the Kemp Smith firm in Albuquerque, appearing on behalf of Southwest Royalties.

EXAMINER CATANACH: Any additional?

Will the witnesses please stand to be --

MR. KELLAHIN: Mr. Examiner, the case file should reflect an entry of appearance by Ernest Carroll on behalf of Yates Petroleum Corporation.

EXAMINER CATANACH: Thank you, Mr. Kellahin.

Can I get the witness to stand and be sworn in?

(Thereupon, the witness was sworn.)

MR. KELLAHIN: Mr. Examiner, this case was

referenced in the prior case. The topic of this particular Application is only one of the issues involved with the Julie Com 3 well. This Application deals with our request for an unorthodox gas well location.

Mr. Hardie is an expert witness in the field of petroleum geology, and his concern is to optimize his opportunity to have this well drilled to test the Morrow.

This well would be a standard location for the Cisco production. And the topic of the case, then, today, is seeking approval from the Division that in the event this well is successful as a Morrow well, that we might produce it at an unorthodox location.

BILL HARDIE,

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, would you please state your name and occupation?

A. My name is Bill Hardie. I'm a geologist with Conoco, Incorporated, and I work the southeast New Mexico area.

Q. You're going to have to yell at us, Mr. Hardie. You're soft-spoken, and the hum of the heater is drowning you out.

You reside where, sir?

A. In Midland, Texas.

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

A. Yes, I have.

Q. Does the topic of this particular Application within your field deal with matters that you have personal knowledge about?

A. Yes.

Q. And based upon your personal knowledge, have you made a study of the technical issues regarding this Application?

A. Yes, I have.

Q. And based upon that study, do you now have certain opinions and conclusions as a geologist?

A. I do.

MR. KELLAHIN: We tender Mr. Hardie as an expert.

EXAMINER CATANACH: Mr. Hardie is so qualified.

Q. (By Mr. Kellahin) Mr. Hardie, if you'll turn to what we've marked as Conoco Exhibit 1, have you identify for us the basic items on the display and then I'll ask you some questions.

A. Exhibit 1 is simply a base map of the North Dagger Draw area. On it I've shown Conoco-operated acreage in solid yellow shading.

Acreage that Conoco has a working interest in but does not operate, I've shown with cross-hatched yellow shading.

I've also highlighted the proposed Cisco/Morrow well, the Julie Com Number 3, in the northeastern quarter of Section 17. It's located 660 feet from the north line, 660 feet from the east line of Section 17.

Q. When we look at the well symbols on this display, what kinds of wells are we looking at?

A. For the most part we're looking at oil wells that are completed in the North Dagger Draw-Upper Penn Pool. The black -- Solid black circles indicate that they're oil-productive.

Solid red circles indicate recently drilled and completed oil wells, so you can get a good idea about where the most recent activity is.

Open circles indicate proposed wells.

Q. How would we direct the Examiner's attention to any Morrow wells that have been drilled within the area shown on the display?

A. Most of the Morrow wells that have been drilled are gas wells. Well, all of them are. So typically on this display, if it's a gas well symbol, then it has been completed in the Morrow formation.

There's also a possibility that it may produce

out of the Atoka formation. Both of those are gas-productive.

Q. Will we have a later display to show the Examiner specifically the Morrow attempts and completions within the area of concern?

A. Yes.

Q. What are the meaning and purpose of those blocks within the north half of 17 that are shaded in blue?

A. Those blocks indicate the orthodox windows for a 320-acre spacing unit, which is what the Morrow would be. So within those windows any wells would be orthodox.

Q. Based upon your geologic study, why are you not drilling this well at a standard Morrow gas well location?

A. Because of the excessive risk involved with Morrow completions, we are limited to drilling Morrow wells as tails on Cisco development wells. And in this particular case, the only remaining Cisco location in the northeast quarter of Section 17 is the Julie Com Number 3, which is standard at the Cisco.

Coincidentally, this location also appears to be prospective at the Morrow horizon.

So we are somewhat constrained by the Cisco in our attempts to develop Morrow.

Q. For the Morrow gas production that has been obtained in this area, has the Division identified that

production with any pool name?

A. Morrow production in this area has been called the Boyd-Morrow Pool, and the nearest producing well from the Boyd-Morrow Pool is found in the southwest corner of Section 9, which would be just northeast of our proposed well. It's labeled as the Fasken (Morrow) well. It's a gas well.

Q. We have submitted to the Division Examiner a certificate of mailing of notice to the offset operators towards whom this unorthodox location encroaches. For the record, would you identify for us those operators who are entitled to notice?

A. Those operators are shown in the red text surrounding the north half of Section 17. The most directly affected operators would be those in Section 16, which lies due east of the proposed location. That would be Yates Petroleum.

The next most affected would be those operators in the south half of Section 9, and in that section Fasken operates the Morrow, and Yates Petroleum operates the Cisco/Canyon.

Q. In addition, have you caused notification to be sent to the working interest owners for those spacing units towards which you are moving, which do not have a producing gas well?

A. Yes.

Q. Have you received any objection from any of those parties towards whom this well encroaches?

A. We have not.

Q. Let's turn to Exhibit Number 2. Identify for us the source of the information used for Exhibit 2.

A. Exhibit 2 is a surface topographic map copied from the USGS 7-1/2-minute quadrangle series, and it shows the north half of Section 17 and the surface features which may or may not limit the drilling of locations within the Morrow orthodox windows, which on this map are shown again with the green shading.

Q. Do you have experience with utilizing those USGS quadrangle maps?

A. Yes, I do.

Q. And have they proved to be accurate and reliable with regards to this particular area?

A. Yes, they have.

Q. Have you been on the surface of this area and compared the surface topography to the mapping shown by the quadrangle maps?

A. Yes, I have.

Q. And how do they compare?

A. They compare -- They are the same. The map is an accurate reflection of what's going on at the surface.

Q. Do you have any surface limitations with regards to the siting on the surface of the proposed Julie Com Number 3?

A. There are no surface limitations for that location.

Q. Let's turn now to Exhibit Number 3. What kind of map are we looking at?

A. Exhibit Number 3 is an isopach map of the dolomite reservoir thickness for the Cisco/Canyon formation.

Q. Who prepared the map?

A. I did.

Q. What's your experience in doing this kind of work in this particular reservoir?

A. We have found that isopach maps on the dolomite are a good indication of the productivity in the Cisco/Canyon. And what I'm showing with this exhibit is that at our proposed location at the Julie Com Number 3, we would expect to encounter a gross dolomite thickness of about 220 feet. This is a -- would be a standard infill location, development location, at the Cisco/Canyon horizon.

Q. How long have you been working as a geologist for your company, looking at the specific geologic details of the North Dagger Draw Pool?

A. For approximately five years.

Q. Do you have remaining available to you in this spacing unit any other location that would be a standard location for a Cisco attempt?

A. The proration unit for Cisco development is 160 acres, and it would comprise the northeast corner of Section 17. Within that northeast corner, there is only one remaining location for Cisco development, and that is the Julie Com Number 3.

Q. All right, let's turn to Exhibit Number 4. Identify for us what Exhibit 4 is.

A. Exhibit 4 is a structure map on the top of the Cisco/Canyon dolomite.

Q. Who prepared this map?

A. I prepared this map.

Q. Why did you propose to draw this map on top of the Cisco/Canyon dolomite?

A. This map is the best indication of the relative elevation of the reservoir and provides us with an indication of how much of that reservoir will be within the oil column.

Q. Is structure a component of significance to you as a geologist when you're looking for Cisco locations in the North Dagger Draw?

A. It's a very important component.

Q. What conclusion do you reach, having made your geologic investigation using this type of procedure?

A. We, based on this map, would anticipate that the top of the reservoir would occur at approximately minus 4220 feet subsea elevation. We believe that in this area the oil-water contact is at approximately minus 4300 feet of elevation. That would give us approximately 80 feet of gross dolomite within the oil column.

As you can see by adjacent completions, that amount of pay has been economically productive.

Yates recently drilled their Warren Number 2 to the northeast of our location, and I'm not positive about the current rate, but I believe it IP'd somewhere between 300 and 400 barrels of oil per day.

So we have reason to believe that this elevation is sufficient to produce economic reserves.

Q. Does the North Dagger Draw produce water?

A. Yes, it does.

Q. Is the production of that water of significant concern to you as a geologist?

A. It is.

Q. And how do you handle that problem in terms of finding a location?

A. Typically, we select a location which is sufficiently above where we believe the oil-water contact

to exist. And then once we drill that well, we try to avoid perforating near the oil-water contact.

Q. Even if you're successful with that strategy, do these oil wells continue to produce substantial quantities of water?

A. They do in many cases.

Q. Let's turn now to the Morrow. Identify for us what is shown as Exhibit 5.

A. Exhibit 5 is actually a combination of two maps. With the purple contours I'm showing a structural map on the top of the Morrow clastics. It's a marker that's very near the reservoir that's productive in the Boyd-Morrow field.

Q. Is this your work product?

A. Yes, it is.

Q. Having displayed the structure, what also have you displayed?

A. The second part of this is a color-filled contour map. It's an isopach of the sand thickness in the Morrow formation, and it's graded such that thinner sands are represented by yellow colors, and then as they become thicker and thicker, they get more red, so that the thickest part of the sand isopach on this map is something over 60 feet.

Q. Is the Boyd-Morrow Gas Pool one where the

operators have elected to drill straight-up single-completion gas wells in the Morrow formation?

A. At the time those wells were drilled, the North Dagger Draw Pool was not even recognized as a viable target. They were drilled in the early Seventies, and it was believed at that time that Dagger Draw was primarily water productive with marginal amounts of oil. We now know that to be much different. So that they were drilled as primary Morrow targets.

Q. Do operators still do that for Morrow in this area?

A. Almost never.

Q. What is their exploitation strategy for accessing the Morrow?

A. Primarily due to the excessive risk in Morrow completions, the strategy is to find a Cisco development well under which there lies a Morrow prospect, and pretty much let the Cisco determine the location of that well.

In this particular case, it's coincidental that our only remaining Cisco location is also, according to this map, the best Morrow location in the north half of Section 17. That's primarily due to the sand thickness. This is the location at which we would expect to find approximately 50 feet of sand thickness in the Morrow.

Q. Would you recommend to your management that you

drill this proposed unorthodox Morrow location as a Morrow stand-alone?

A. No, I would not.

Q. The only way you would recommend it is how, sir?

A. Is as a tail on an existing Cisco well. It takes approximately 1500 feet of additional drilling to reach the Morrow at, I think, a cost of approximately -- a dryhole cost of approximately $80,000.

The odds of completing a Morrow, based on statistics from this area, are approximately one in ten, of actually finding something that's commercial.

Q. Is it common for the operators in this area to afford their competitors the opportunity to add a Morrow tail onto their Cisco wells at an unorthodox location without opposition?

A. That has been the practice thus far.

Q. Let's turn now to your cross-section.

A. The cross-section is shown on Exhibit 5 -- get an idea of where the wells lie -- and this is drawn from the Boyd-Morrow field in Section 9, which is at the right-hand side of the cross-section, and then it's drawn through the proposed Julie Com 3 location and into the south half of Section 17 where Conoco drilled a dryhole to the Morrow, the Barbara Com Number 17 well.

This cross-section is designed to show the

correlation that I have made of the Morrow sand.

This is a little bit unusual in that it's not a channel sand, which is the more typical target in the Morrow. This is a strand-line deposit. Strand lines tend to be a little bit more mappable than channel sands. They're a little easier to correlate. The long axis of the sand body, when it's a strand line, tends to trend parallel to strike.

And Conoco's objective in drilling its Julie Com Number 3 is to more or less split the difference between our dryhole and the Barbara Com 17, which was dry due to it being tight, and the productive well, namely the Fasken Number 1 Johnston Federal, which is currently productive in the Morrow. It was drilled in 1972 and has cum'd, I believe, 3.1 billion cubic feet of gas.

Q. In your opinion, should the Examiner approve this Application, will it afford Conoco the opportunity to recover potential hydrocarbons out of the Morrow Pool that it might not otherwise recover?

A. Yes.

Q. Was this cross-section also prepared by you?

A. It was.

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

We move the introduction of Conoco Exhibits 1

through 6 and the introduction of the certificate of mailing, which is unmarked but I will stamp it as Exhibit 7.

EXAMINER CATANACH: Exhibit 1 through 6 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Hardie, is there more than one producing sand interval in the Morrow?

A. The only one that's been perforated is the one -- the upper sand that you can see on the cross-section. Perforations are shown by the black-shaded area at the middle of each well column.

Although there are sands beneath that, I suspect those are too thin and too tight to be productive.

Q. Your Exhibit Number 5, is that gross sand that you map?

A. That is a gross-sand map. I have applied no cutoff, other than whether or not the sand was present. There's no porosity cutoff applied to that.

Q. Have you mapped it with a porosity cutoff?

A. I have not, because I don't feel as a geologist that that is a useful map. The preservation of porosity in the Morrow is not well understood, and without an understanding of how that porosity is preserved I find it

difficult to map it and interpret a map based on that.

Q. Based on your gross-sand map, you're going to gain maybe ten feet of gross sand in the Morrow, drilling at the proposed location?

A. The -- Versus a standard location?

Q. Versus a standard, I'm sorry, yes.

A. That is correct. The Barbara 17, which is in the south half of Section 17, encountered 26 feet of sand. It was a good, clean sand, but it was tight.

We feel that when we optimize the sand thickness, we encounter a better opportunity to find adequate porosity and permeability as well, which is why we would like to maximize our opportunity to encounter the maximum thickness.

Q. What other Morrow penetrations did you use to construct this map?

A. All of the penetrations shown, or all of the Morrow wells that are shown on this map were used in its construction.

Q. And those are shown as gas wells?

A. Well, some of them are shown as oil wells because they were dry in the Morrow. But the maps shown were penetrations to the Morrow, and most of them on this map, of course, had no sand in them. The only ones that are within the confines of the color-filled contours actually

had some sand in them.

Q. There have been no Morrow penetrations in the north half of 17?

A. There have not.

Q. Did you utilize any other information besides well control?

A. No, I did not, other than interpretation, knowledge about the geometry of strand-line sandbodies and such.

Q. I believe it was your testimony that the proposed location also represents the best Cisco location in that northeast quarter?

A. It's the only remaining Cisco location. I don't think it would be the best one. There are others that would be better, but they've already been drilled.

Q. Do you know if the Julie Com 1 ever produced from that pool?

A. It produced from the Upper Penn Pool. It was drilled by Roger Hanks, I believe, in the early Seventies. It had a very high initial rate of approximately 700 barrels of oil per day, declined very rapidly, and watered out very quickly and was plugged.

Q. Okay, structurally is that about the same position as the proposed Number 3?

A. Yes, it is. We believe that the Julie Com Number

1 watered out due to improper completion techniques and that it was plugged as a result of that. Roger Hanks either didn't get an appropriate cement job across the reservoir to isolate the water zone, or he perforated the water zone.

This was drilled in an early stage of development of the field, and there was very little understanding about where the water was.

Q. What are Conoco's plans with regards to if the well -- If you do make a Morrow completion, is that -- will the well be produced as a single Morrow?

A. That is something we typically look at after we've drilled the well.

If it's a high-rate Morrow well, there's a possibility of twinning it, to drill a Cisco location. If the rate is low enough, there's a possibility of dualing it to the Cisco. And that's something we usually decide upon after it's been drilled.

Of course, the most likely outcome is that the Morrow will be dry, based on statistics. So that decision is usually pretty easy, although we hope for better.

Q. As far as you know, you've had no opposition from Fasken to this location?

A. We have communicated with Fasken about this location, and they have expressed no interest in opposing

the case.

EXAMINER CATANACH: That's all I have, Mr. Kellahin.

MR. KELLAHIN: That concludes our presentation.

EXAMINER CATANACH: All right. There being nothing further in this case, 11,241 will be taken under advisement.

(Thereupon, these proceedings were concluded at 11:58 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11241, heard by me on April 6 1995.

David R. Catanach, 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 April 16th, 1995.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998