STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 10,746

EXAMINER HEARING

IN THE MATTER OF:

Application of Devon Energy Corporation for special pool Rules, Eddy County, New Mexico

ORIGINAL

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

July 15, 1993

A P P E A R A N C E S

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I N D E X

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E X H I B I T S

APPLICANT'S EXHIBITS:

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WHEREUPON, the following proceedings were had at 9:16 a.m.:

EXAMINER CATANACH: At this time we will call Case 10,746.

MR. STOVALL: Application of Devon Energy Corporation for special pool rules, Eddy County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm, Campbell, Carr, Berge and Sheridan.

I represent Devon Energy Corporation in this matter, and I have one witness.

EXAMINER CATANACH: Additional appearances?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of Kaiser-Francis Oil Company.

EXAMINER CATANACH: Any additional appearances?

MR. CARR: Mr. Examiner, I have one witness that needs to be sworn.

EXAMINER CATANACH: We'll do that right now.

(Thereupon, the witness was sworn.)

EXAMINER CATANACH: Mr. Kellahin, I assume

you don't have any witnesses?

MR. KELLAHIN: Mr. Carr and I have worked out on the issue. This case was readvertised. We had discussions earlier about what pool to put this in, and I think that's resolved.

EXAMINER CATANACH: Okay.

MR. KELLAHIN: So there's no witnesses on my behalf.

EXAMINER CATANACH: Okay.

MR. CARR: As a follow-up to that, Mr. Catanach, this case involves the recent drilling of a well by Devon. When the completion forms were filed with the OCD, it was placed in the Soapberry Draw Delaware Pool. It was then discovered that it was more appropriately in the East Catclaw Draw.

The case was continued to correct the pool designation, and we're here today with, we believe, the well in the correct pool.

EXAMINER CATANACH: I see, okay.

DICK MORROW,

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

DIRECT EXAMINATION

BY MR. CARR:

Q. Would you state your name for the record,

please?

A. My name is Dick Morrow.

Q. Where do you reside?

A. Edmond, Oklahoma.

Q. By whom are you employed?

A. Devon Energy Corporation.

Q. And what is your position with Devon?

A. I'm a senior petroleum engineer.

Q. Have you previously testified before this Division?

A. No, I have not.

Q. Could you briefly summarize your educational background and review your work experience?

A. I graduated in 1976 with a bachelor of science in petroleum engineering from the University of Kansas.

From 1976 through 1982 I was employed by Exxon Company, USA, as a petroleum engineer, with my main assignments in Midland and Andrews, Texas.

From 1982 through 1990 I was employed in Oklahoma City by Woods Petroleum Corporation as a petroleum engineer.

Since September of 1990, I've been employed by Devon Energy Corporation as a senior reservoir engineer with my main areas of responsibility to be

west Texas and New Mexico.

I am a registered professional engineer in both Oklahoma and Wyoming.

Q. Are you familiar with the Application filed in this case on behalf of Devon?

A. Yes, I am.

Q. And are you familiar with the Delaware formation in the area which is involved in this case?

A. Yes.

MR. CARR: We tender Mr. Morrow as an expert witness in petroleum engineering.

EXAMINER CATANACH: Mr. Morrow is so qualified.

Q. (By Mr. Carr) Mr. Morrow, would you briefly state what Devon Energy seeks with this Application?

A. We seek a promulgation of special pool rules for the East Catclaw Delaware Pool to establish a gas/oil ratio limit of 6000 to one.

Q. By way of background, could you just tell us when this pool was originally created?

A. The initial Order was R-9418, and the pool was created on February 1st, 1991.

I believe it's since been expanded to include all of Section 9, 21 South, 26 East in Eddy County.

Q. Have you prepared certain exhibits for

presentation here today?

A. Yes, I have.

Q. Could you refer to what has been marked as Devon Exhibit Number 1, identify this and review it for Mr. Catanach?

A. Exhibit Number 1 is an area map. This area is about four miles northwest of Carlsbad and about three miles east of the Avalon Reservoir.

I've shown the nine sections which surround Section 9. I've shown the outline of the pool boundary.

There are seven wells in this pool, in Section 9, which are the black circles, seven of which are still active.

There's only one operator in this pool, and that's Chi Energy -- Chi Operating, excuse me.

I've also shown with the red arrow the location of Devon's Cactus State Number 1, which is immediately south of Section 9, in Section 16.

Around this area I've shown all the other wells that produce. They're essentially all gas wells which produce from deeper horizons.

Q. And Mr. Morrow, the Cactus State Number 1 well is located within a mile of the East Catclaw Draw Pool; is that correct?

A. Yes, it is.

Q. And therefore, it is governed by the pool rules that are promulgated for that particular pool?

A. That's correct.

Q. What are the current rules which cover development of the East Catclaw Draw Pool area?

A. The East Catclaw Draw Pool operates under statewide rules with 40-acre spacing.

Oil allowable is 80 barrels a day with a 2000-to-one GOR, which results in a gas allowable of 160 MCF a day for a 40-acre well.

Q. Let's now go to Devon Exhibit Number 2. Would you identify this and review it, please?

A. Exhibit Number 2 is a structure map on top of one of the Delaware sands in the area, and this is all based on well logs.

The Delaware sands are present throughout most of this portion of the Basin, and oil and gas traps are created either stratigraphically or structurally.

I've shown here an outline of the pool in yellow, Section 9, and again the location of Devon's Cactus State Number 1 with the red arrow.

Basically we have here a structural high which extends from the south half of Section 4 down

through Section 9 into our Section number 16.

Q. From a structural point of view, this would tend to support inclusion of the Devon well in the East Catclaw Draw Delaware Pool; is that correct?

A. Yes, it does.

Q. This would not be Soapberry Draw, which is off to the west of East Catclaw?

A. Correct. Soapberry draw is to the west in Section 8.

Q. Let's now go to Devon Exhibit Number 3. Please identify that and review it for Mr. Catanach.

A. Exhibit Number 3 is a north-south cross-section which starts about the middle of Section 9 and goes down through our well in Section 16.

The Devon Cactus State Number 1 is on the left, which is the south, and then to the right-hand side of the paper we move to the north.

This shows several of the Delaware sands that we have penetrated with our well. The Delaware sands are actually a very thick sequence. They cover about 2000 feet, starting in our well about 2200 feet, going down to about 4200 feet. This just shows the package of sands that are in the Delaware Oil Pool.

We've shown the perforations in our Cactus State Number 1 in the green blocks, which start at a

depth of 3040 feet and go down to 3220. I've also shown the perforations in some of the Chi Operating wells.

In the Wiser State Number 2 you can see they perforated about 3200 feet, down in what we call the "D" sand.

In the next well, the Oxy State Number 1, their perforations are actually slightly above this cross-section.

And in the Wiser State Number 1, which is the well to the north, their perforations are at about 2700 feet.

This just shows that the Cactus State Number 1 is in the same package of Delaware Sands that are in the East Catclaw Draw Delaware Pool.

Q. All right. Let's move to Exhibit Number 4, your east-west cross-section, and again I'd ask you to review that for Mr. Catanach.

A. Okay. This is a very large cross-section which will probably cover your whole desk. This actually has two cross-sections -- two lines of cross-sections on it, A-A', which kind of runs through the north part of Section 9 --

MR. STOVALL: Hold on just a second till we get unfolded.

THE WITNESS: Okay. A-A', which kind of runs through the north half of Section 9, which I really don't intend to cover. And cross-section B-B', which runs through the south half of Section 9.

Neither of these cross-sections include our Devon well, but I think they show better the package of sands that are developed in the East Catclaw Draw Pool. And it also shows the separation from the East Catclaw Draw Pool to the Soapberry Draw Delaware Gas Pool.

The Kaiser-Francis well is the first well in cross-section B-B', and they're perforated down in the Delaware sand near the bottom of the cross-section at 4046 feet, whereas we are perforated up in this package of sands around 3000 or 3200 feet.

So you can see there's a lot of distance between what's in the Soapberry Draw Delaware Gas Pool and in what is the East Catclaw Draw Delaware Oil Pool. And we are better -- We are in the East Catclaw Draw Delaware Oil Pool with our well.

Q. (By Mr. Carr) All right, Mr. Morrow, let's now move on to Devon Exhibit Number 5. I'd like you first to identify this exhibit and then review it for Mr. Catanach.

A. Exhibit Number 5 is a plot of the daily oil and gas production for our Cactus State Number 1 well.

It was completed back in March and began production on March 24th.

Shown on this plot in the dark line connecting the black squares is the daily oil production. Kind of a dashed line connecting the open triangles is the daily gas production. And the top line connecting the black diamonds is the gas/oil ratio.

What we've tried to do with this well is adjust the choke to try to produce it at the allowable.

And what we've found out is that if you choke back the oil production, the gas production stays about the same and your GOR goes way up.

If you'll notice, right when the well came on line we tried to choke the oil production back to about 50 or 60 barrels a day, gas production remained essentially constant, and the gas/oil ratio went up to about 4000.

After we did some more work on the well in the first part of May, you can see there are three instances where we tried to choke the well back. Gas production stayed about the same, and our GOR went way up to 8000 or 10,000.

Since then, the well has stabilized at about 80 to 100 barrels a day, with a gas/oil ratio of

between 5000 and 6000.

I believe what this shows is that if we have to pinch the well back to try to produce at a lower GOR, the GOR actually increases, and essentially we are bleeding off gas pressure, losing reservoir pressure, and essentially wasting ultimate oil recovery.

I believe if we try to pinch the well back, we will dissipate the reservoir energy sooner than it would be if we could produce it at a higher GOR.

Q. So what happens actually is, when you curtail production, your gas production continues; it's the oil which you lose?

A. That's correct.

Q. And in the meantime, you're dissipating the reservoir energy?

A. That's correct.

Q. And the oil that's left in the ground, therefore, some of it would ultimately not be recovered?

A. Right, we would lose ultimate recovery by choking the well back.

Q. And the result of that is the waste of hydrocarbons?

A. That's correct.

Q. Let's move to Devon Exhibit Number 6. Could

you identify and review that, please?

A. Exhibit Number 6 is simply the tabular data that went into Exhibit Number 5. It's just some backup data that shows the daily oil, gas, GOR, water production and tubing/casing pressures for the well.

Q. Mr. Morrow, would you now identify Devon Exhibit Number 7 and review the information on that exhibit for the Examiner?

A. Exhibit Number 7 is a tabular production of the wells that are in the East Catclaw Draw Delaware Pool, which are operated by Chi Energy.

This shows the monthly oil and gas and GOR production for all the wells.

I'd simply like to point out at the very bottom of this chart, I've highlighted the cumulative gas/oil ratio for the life of these wells to show that this is a high GOR oil pool. The GORs range from about 2000 up to over 4600 for the wells that are currently operating in the pool.

Q. All right. Let's now move to Devon's Exhibit Number 8. Would you identify and review that, please?

A. Exhibit Number 8 is a calculation showing the payout of our investment in these wells under different cases.

My basic assumptions are that the cost to

drill and complete one of these wells is about $346,000.

I base my economic calculations on an oil price of $19 west Texas intermediate, less two and a quarter for sour crude -- this area has H_2S in it -- a gas price of $1.50 per MCF.

I've shown two cases there.

What our payout would be under a 6000 GOR limit, would be about eight months.

If we were limited to 2000 gas/oil ratio, our payout would be about 27 months. And for this type of well it is very hard to justify additional drilling with over a two-year payout.

The result of this would be that producible hydrocarbons would be left in the ground if we were not economically able to drill these wells.

Q. So basically increasing the gas/oil ratio is going to provide economic incentive for additional development?

A. Yes, it will.

Q. Without it, there's a chance that additional wells just might not be drilled?

A. That's correct.

Q. And I guess your attorney misnumbered. Is Exhibit Number 10 an affidavit confirming that notice

of this Application has been provided to those affected interest owners who are entitled to notice under OCD rules?

A. Yes, it is.

Q. And attached to the affidavit is a listing of the parties to whom notices have actually been provided and, behind that, copies of the notice letters?

A. That's correct.

Q. In your opinion, if special rules are promulgated for this pool on a temporary basis, when would you recommend that this case be reopened and the matter re-examined by the Oil Conservation Division?

A. I would think we would probably need a period of 18 months to two years before we re-opened the case.

Based on the current mapping, we could drill probably three to four additional wells. We feel it would probably take a year to get these wells drilled and completed. After that, we would need sufficient time to gather enough production history to make our final determination.

Q. In 18 months to two years do you believe you could appear before the Division with sufficient information to make a recommendation for permanent rules for this pool?

A. Yes, I believe we could.

Q. In your opinion, would approval of this Application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes, I do.

Q. Were Exhibits 1 through 8 prepared by you?

A. Yes.

Q. And Exhibit 10 is the notice affidavit?

A. Right.

MR. CARR: At this time, Mr. Catanach, we would move the admission of Devon Exhibits 1 through 8 and 10.

EXAMINER CATANACH: Exhibits 1 through 8 and 10 will be admitted as evidence.

MR. CARR: That concludes my direct examination of Mr. Morrow.

EXAMINER CATANACH: Mr. Kellahin?

MR. KELLAHIN: Thank you, Mr. Examiner. No questions.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Morrow, is the Devon well actually being produced out of some of the same sands that are being produced in the Chi wells?

A. Yes, sir. Yes.

Q. It seems that the Chi wells, from your cross-section, are producing at a higher -- from higher sands?

A. Well, if you look at the well, I believe it's on Exhibit Number 3, the north-south cross-section, the well which is immediately offset to us, right across the lease line, is producing from what we call the Chi "D" sand, right at 3200 feet, showing the perforations there, which is the correlative sand to which we have perforated in our well.

And I believe the wells that are further to the north in Section 9 also produce from some of these various lower sands.

Q. Are these -- In your opinion, are these sands vertically segregated?

A. Given the distance from the lowestmost sand to the uppermost sand, some of them probably are.

But basically it is a common source of oil supply separate from the -- for instance, the Soapberry Draw Delaware gas reservoir, which is deeper.

Q. You've got -- in the Devon well, you've got three different sands perforated?

A. Yes.

Q. Have you run any kind of profile on these to see what's coming out of each zone?

A. No, we have not.

Q. Do you believe that you've got oil production from each of the sands?

A. Yes, we do.

Q. On your Exhibit Number 5, you -- I believe you previously gave me three examples of when you tried to choke back the oil production?

A. Yes.

Q. What dates were those again?

A. If you look -- Are you looking on Exhibit Number 5 or Exhibit Number 6, the actual --

Q. Five.

A. Okay. You can see the first -- When we first brought the well on, on March 24th, we produced it for about three days, over 100 barrels a day. Then we tried to choke it back the next three days.

A. Uh-huh.

Q. See there, very early on in the life of the well?

Gas production remained about 180 MCF a day, and you can see the resulting increase in the GOR. That was one example.

The next example is after we brought the well back on in the end of April there. The actual date is kind of hard to tell from this plot. April 30th or May

1st, you can see we tried to choke the well back to about 40 barrels a day, and our GOR went up to about 10,000.

Then again, about four days later we choked it back to 50 barrels a day, and the GOR went up to almost 9000.

And then a few days after that, we choked it back again and the GOR went up to -- about 8500, it looks like.

Q. An increase in the GOR after you've cut back on the oil production isn't normally what you would expect in a situation like this; is that correct?

A. It's not what you would expect in a single layer, homogeneous reservoir. But when you start having multiple layers and different reservoir characteristics, it's really hard to tell what you're going to expect when you do something like this to a well.

Q. Would you expect that a high GOR might singly hurt one of the sands, as opposed to benefitting as a whole? Might it be detrimental to one or more sands?

A. I don't believe so. I think that the -- All the Delaware sands, as I mentioned before, are basically, in this area, a common source of supply with very similar fluid characteristics.

I don't think you have one zone that's predominantly oil and one that's predominantly gas. I think they're all basically the same fluid with a high GOR.

So I don't think that one zone would be preferentially hurt or helped as opposed to another.

Q. Is your well over-produced at this point?

A. I don't know the answer to that.

Q. Okay. When you tried to cut back on the oil production, do you think that you allowed enough time for the rate to stabilize?

A. I think we've seen that, talking to the field people that actually, you know, work on the well, and to our production engineer that, yes, I think it's sufficient time.

Q. Does -- Have you talked to Chi about your proposal, Chi Energy?

A. I have not talked to them personally about it. I believe they've been -- Our land department has been in contact with them.

I might mention that Chi Operating is a working interest owner in our well also.

Q. This pool's been effectively developed for at least two years at a 2000-to-one GOR.

Do you feel there's sufficient reason to

change at this point?

A. I believe that with this extension of the field, yes, I do. I think with the new structure map that we have and the possibility of further extension, I think the increased GOR allowable is warranted.

MR. STOVALL: Who are the offset operators around the pool?

Let me ask you a preliminary question. Maybe I'm asking the wrong person.

Who made the determination about who you should be giving notice to? Is that largely Mr. Carr, or were you involved in that? Do you have knowledge of it?

THE WITNESS: No, I do not. That was handled through our law department with Mr. Carr. Our land department, I'm sorry.

MR. STOVALL: Mr. Carr, did we get everybody within a mile, operators within a mile?

MR. CARR: All operators within a mile have been notified. And we got this information from the land department.

If you'd like me to confirm that to you, Mr. Stovall, I'd be glad to.

MR. STOVALL: Your affidavit is confirmation. I'm just assuming that's what you intended when you

said all people entitled to notice. I just thought I'd ask and make sure.

MR. CARR: I'll put it in writing again if you'd like.

MR. STOVALL: That's why we get affidavits these days.

Q. (By Examiner Catanach) Mr. Morrow, have you had a chance to examine any of the Chi wells with respect to if they show the same kind of producing characteristics as your well, with respect to an increasing GOR?

A. No, I have not really examined that to that detail. Basically all I did was look at the monthly production on the wells. I did not really look at the individual producing characteristics as far as choke settings and daily production.

Q. So your opinion that this won't cause any reservoir waste, this increase in GOR, is really based on the three one-day tests that you have discussed in your Exhibit 5?

A. Well, I believe it's more than just three one-day tests. I think if you look across that whole plot, you can see the times where we tried to curtail oil production, the gas production remained fairly constant, resulting in a higher GOR.

I think they've noticed that for the two or three months this well's been on production.

Q. It does appear in some instances when the oil production drops down, the GOR actually drops down as well, in some of the figures here.

So this isn't really a consistent thing that's happening all the time?

A. Well, you also, I think, have to realize that some of these daily production numbers are actual -- You have natural fluctuations in the performance of the well that are not specifically caused by the choke setting on the well.

But the instances where we did choke the well back, you can see that GOR spike.

Q. But you don't have marked on this exhibit which actually were the times that the well was choked back?

A. No, I don't.

Q. Can you provide that information to me?

A. I believe I can. I'd have to go back and look at our daily records.

Q. Okay, I would appreciate that.

EXAMINATION

BY MR. STOVALL:

Q. Mr. Morrow, you're asking for a 6000-to-one

GOR; is that correct?

A. Yes.

Q. Now, it looks like, assuming a pool extension, that yours is the only well in that range, and it looks like at last production shown on here, you're more in the 4000 range; is that correct?

I mean, as you kind of follow the trend of your GOR line, it looks to me like it's beginning to level out around 4000?

A. I believe it's in like the 5000-to-6000 range over the last several weeks' production.

Q. Oh, I'm sorry, you're right. Yeah, I was off one...

The other wells in the pool which have got anywhere from a year to two years' production -- excuse me, two years' to three years' production -- are all -- the highest one is 4600. The rest of them are all under 4000, are they not?

A. Yes, that's correct.

Q. And again, just looking at your -- I'm looking at Exhibit 7. It looks -- It appears to me in just looking at the thing that there was some movement but it's -- they have tended, after they've kind of stabilized, to kind of come down a little bit. Without a curve, it's kind of hard to see that, but...

In other words, why are we going for the maximum GOR that we might expect in your well when the pool doesn't seem to indicate it, that 6000 is really what you need. Maybe 4000 might give you some of the incentives you're talking about, without maxing the gas production?

A. Well, I think if you look at -- if you refer back to Exhibit Number 2, which is our structure map --

Q. Uh-huh.

A. -- we are structurally higher, slightly higher than some of the Chi wells, and I believe that the further extension of the reservoir in Section 16 will be more structurally similar to our well than the Chi wells, and I think they will be slightly higher GOR than the Chi wells.

Q. What's your contour interval on that?

A. I believe it's 50 feet. Yes.

Q. And this is a subsea?

A. Yes.

MR. STOVALL: That's all I have.

EXAMINER CATANACH: I have nothing further.

MR. CARR: Mr. Catanach, we have nothing further in this case.

We will submit to you in writing the dates from our daily record as to when the well was

curtailed.

EXAMINER CATANACH: Okay, thank you, Mr. Carr.

There being nothing further, Case 10,746 will be taken under advisement.

(Thereupon, these proceedings were concluded at 9:50 a.m.)

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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 18th, 1993.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1994

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division