NEW MEXICO OIL CONSERVATION DIVISION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NO. 10145

IN THE MATTER OF:

Case 10145 being reopened pursuant to the provisions of Division Order No. R-6368-B, which order promulgated a temporary gas-oil ratio limitation of 4,000 to 1 for the Avalon-Delaware Pool in Eddy County, New Mexico.

BEFORE:

DAVID R. CATANACH

Hearing Examiner

State Land Office Building

June 25, 1992

REPORTED BY:

DEBBIE VESTAL
Certified Shorthand Reporter
for the State of New Mexico

ORIGINAL

A P P E A R A N C E S

FOR THE NEW MEXICO OIL CONSERVATION DIVISION:

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FOR THE APPLICANT:

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BY: **WILLIAM F. CARR, ESQ.**

I N D E X

E X H I B I T S

EXAMINER CATANACH: At this time we'll call Case 10145.

MR. STOVALL: In the matter of Case 10145 being reopened pursuant to the provisions of Division Order No. R-6863-B, which order promulgated a temporary gas-oil ratio limitation of 4,000 to 1 for the Avalon-Delaware Pool in 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 & Sheridan. I represent Yates Petroleum Corporation in this matter, and I have one witness.

MR. STOVALL: I bet I can guess who it is too.

ROBERT S. FANT

Having been duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. CARR:

Q. Will you state your name for the record, please?

A. Robert S. Fant.

Q. Where do you reside?
A. Artesia, New Mexico.
Q. By whom are you employed and in what capacity?
A. Yates Petroleum as a petroleum engineer.
Q. Mr. Fant, have you previously testified before this Division and had your credentials as a petroleum engineer accepted and made a matter of record?
A. Yes, I have.
Q. Are you familiar with the Avalon-Delaware Pool and the temporary pool rules promulgated therefor?
A. Yes, sir.
Q. What are the provisions of these temporary pool rules that depart from statewide rules?
A. The temporary pool rules established a GOR limitation for the Avalon-Delaware Pool of 4,000 standard cubic feet per barrel. That along with the 80 barrel per day standard allowable, which comes from the statewide rules, yields a daily gas allowable for each well of 320 Mcf per day.

Q. And what is the purpose of Yates' presentation here today?

A. I intend to show evidence that the pool rules should be -- the temporary pool rules should be established as permanent and that the findings that Dr. Boneau presented in the original hearing were true.

MR. CARR: Are the witness' qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (BY MR. CARR) Mr. Fant, have you prepared certain exhibits for presentation here today?

A. Yes, sir, I have.

Q. Would you refer to what has been marked as Yates Exhibit No. 1, identify this, and review it for the Examiner?

A. This is a copy of a land map with a bold outline showing the Avalon-Delaware Pool. This is essentially the same map as was presented as Exhibit 1 in the original hearing.

Q. And this shows the development in this area?

A. Yes, sir.

Q. Have you reviewed the testimony that

was presented in the original hearing by Yates in support of special rules for this pool?

A. Yes, sir, I have.

Q. And basically what were the points that Dr. Boneau made at that time?

A. Dr. Boneau asserted that basically three things -- effects would be created by this: Number one, the allowance of the higher GOR would increase oil production for the pool. Number two, that the reservoir energy within the pool would be utilized just as efficiently at the higher GOR as at the statewide rules. And, number three, that correlative rights would be protected.

Q. Let's go to Exhibit No. 2. Would you identify that, please?

A. Exhibit No. 2 is a plot of the oil and gas production in the Avalon-Delaware Pool and also a well count.

Q. And what does this show you?

A. This shows that in approximately January of 1991, at which time the temporary field rules went into effect, you can notice a significant increase in the oil production within the pool.

Q. And this is what Dr. Boneau in fact predicted would happen?

A. Yes, sir.

Q. What also happened to the GOR at that time?

A. Well, the GOR throughout the history of the field had been rising, and the GOR was continuing to rise in the pool.

Q. Okay. Let's move to Yates Exhibit No. 3. Explain what this is to Mr. Catanach.

A. Exhibit No. 3 is a plot of the pool GOR for all the wells within the field versus the cumulative oil production. I plotted it versus cumulative oil production because this takes out the effects of time and demonstrates whether or not the reservoir energy will be utilized effectively.

This particular plot runs out to the time period of the original hearing. So this is the data before the increase in the GOR. I have drawn a line through it giving a best estimate of the regression of this data.

I did not use the final few points on this plot primarily because, as you can see with the well count data, this well count is producing

wells. That's not just wells within the field, just producing wells. Some wells were shut-in. In fact, the high GOR wells were shut-in.

And that was part of the reason for the original hearing, was that those wells were overproducing and were shut-in. Consequently those do not reflect a true GOR for the pool because the data is insufficient.

Q. So basically what the line that you've placed on this graph is is a best fit of the data points shown on the graph?

A. Yes, sir.

Q. Are you ready to go to the next exhibit?

A. Well, I would just like to say on this one, based upon this data at a cumulative production of approximately 2.9 million barrels, based upon this line, we would expect about a 3300 to 3400 standard cubic feet per barrel GOR in the field.

Q. Go to your next exhibit and explain how the information on this graph compares to the information on the preceding exhibit.

A. Basically it's the same graph except it has the additional data up through March of

1992. And what it shows is that the GORs rose for a while, but that was because the wells were turned back on. And ones the wells were -- once the production was evened out, as you can see, the last two points fall very close to this line, certainly within the scatter of the data to begin with.

My point here is that we are basically right where we would be in terms of GOR if the GOR were only at 2,000 cubic feet per barrel. The line suggests that this is where we would be no matter whether we were producing at 4,000 to 1 GOR or a 2,000 to 1 GOR or in essence the reservoir energy is being utilized just as effectively at this GOR as the original GOR limitations.

Q. What you've done here really is tied the GOR to a production rate?

A. To a cumulative production.

Q. And you don't see a waste of reservoir energy as a result of the faster producing rate?

A. No, sir. This shows an independence between the two.

Q. There was some concern at the last hearing about some production under a solution

gas drive. Could you refer to Exhibit No. 5 and explain what you have done to review that and see how the reservoir in fact is performing?

A. There was, as you said, there was an assertion that some of the stringers within the Avalon-Delaware Pool were producing under solution gas drive. And there was a concern that these type of stringers would indeed be harmed by the faster production.

What I did was on this graph we have two different fields' GORs plotted. One of them, the small squares, is the Avalon-Delaware Pool GOR versus cumulative production. The other I researched into textbooks and from one of my textbooks called Applied Petroleum Reservoir Engineering, by Craft and Hawkins, I pulled the data for a field called the Gloyd-Mitchell Zone of the Rodessa Field. And I plotted those along on this plot also. And I will also show evidence that the Gloyd-Mitchell Zone is a classic solution gas drive reservoir.

And, as you can see, the production of these -- the GOR rise in these two reservoirs versus cumulative production is almost identical certainly within the scatter of the data.

Q. What does that tell you?

A. It basically tells me that these reservoirs will be -- are producing under the same basic mechanism, solution gas drive reservoir.

Q. Let's go to what has been marked Yates Exhibit 6. Yates Exhibit 6 is an actual copy and excerpt from the Applied Petroleum Reservoir Engineering textbook. There is a section in the chapter -- in this chapter, and it's Section 11. And it's defined as the "Maximum Efficient Rate." It's on the right-hand side of the exhibit, or the MER.

And I'd like to cover the first three sentences of this first full paragraph. The first one is, "Many studies indicate that the recovery from true solution gas drive reservoirs by primary depletion is essentially independent of both individual well rates and total or reservoir production rates."

The second sentence, "Kelly Tracin Rowe has shown that this is true even for reservoirs with severe permeability stratification where the strata are separated by impermeable barriers and are hydraulically connected only at the wells."

Dr. Boneau in the original testimony in this case asserted that we have different stringers within this field and that they are separated.

And finally, the third sentence, "The Gloyd-Mitchell Zone of the Rodessa Field is an example of a solution gas drive reservoir which is essentially not rate sensitive, i.e. the recovery is unrelated to the rate at which the reservoir is produced."

And by this analogy between the two, I believe that the data has shown that this reservoir is not rate sensitive either.

Q. The Avalon-Delaware?

A. The Avalon-Delaware, yes, sir.

Q. Let's go now to Exhibit No. 7. Would you identify that?

A. Exhibit No. 7 is an update, primarily for informational purposes, of one of Dr. Boneau's exhibits. It has the wells plotted by hand and production cumulative volumes on it. In thousands of barrels of oil and thousands of barrels of water and millions of cubic feet of gas. And it is just an update of the original exhibit.

Q. Mr. Fant, this exhibit is hand-drawn and the wells are not placed on this to scale?

A. The wells are not perfectly placed on this well. They're placed in a relative sense to show within the unit the ABC Unit that they're on.

Q. Let's go now to Exhibit No. 8.

A. Exhibit No. 8 is also an update of one of Dr. Boneau's exhibits. And it shows two things beside the wells. It shows the interval, as Dr. Boneau described them: Middle, Lower, and Upper; and it also shows the 1991 GOR for that well illustrating that high GORs exist in many wells within the field.

Q. Based on your study of the field and in particular on how the field has performed under the temporary rules, are you prepared to make a recommendation to the Examiner as to the pool rules that should apply to this pool?

A. Yes, sir. I feel that the temporary pool rules should be made permanent for this field.

Q. Has Dr. Boneau predicted in fact higher gas or there was an increase in oil production with the higher gas-oil ratios; is that not

correct?

A. That is correct, yes.

Q. And in your opinion you testified that there appears to be no reservoir harm from the increase in gas-oil ratios and the resulting increase in production rates?

A. Yes, sir.

Q. And you see no evidence of reservoir energy as being wasted?

A. No evidence.

Q. Will adoption of these rules on a permanent basis in your opinion be in the best interests of conservation?

A. Yes, sir.

Q. The prevention of waste?

A. Yes, sir.

Q. And the protection of correlative rights?

A. Yes, sir.

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

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

MR. CARR: That concludes my

examination of Mr. Fant.

EXAMINER CATANACH: I guess I don't have any questions.

MR. CARR: Mr. Examiner, we have nothing further.

EXAMINER CATANACH: Do you have any questions, Bob?

MR. STOVALL: I have no questions.

EXAMINER CATANACH: There being nothing further, Case 10145 will be taken under advisement.

MR. CARR: Thank you, Mr. Catanach.

[And the proceedings were concluded.]

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10145, heard by me on June 25 1992.

David R. Catanach, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Debbie Vestal, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; 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 7, 1992.

Debbie Vestal

DEBBIE VESTAL, RPR
NEW MEXICO CSR NO. 3