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 NOS. 11,280 (Reopened) and 11,447 (Consolidated)
IN THE MATTER OF CASE NO. 11,280 BEING REOPENED PURSUANT TO THE PROVISIONS OF DIVISION ORDER NO. R-10,389, WHICH ORDER CREATED THE SOUTH BLACK RIVER-DELAWARE POOL IN EDDY COUNTY, NEW MEXICO, AND PROMULGATED TEMPORARY SPECIAL RULES THEREFOR	
APPLICATION OF ENSERCH EXPLORATION, INC., TO AMEND SPECIAL POOL RULES FOR THE SOUTH BLACK RIVER-DELAWARE POOL, EDDY COUNTY, NEW MEXICO	

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

January 11th, 1996

Santa Fe, New Mexico

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

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I N D E X

January 11th, 1996
Examiner Hearing
CASE NOS. 11,280 (Reopened) and 11,447 (Consolidated)

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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 9:05 a.m.:

EXAMINER STOGNER: At this time I will call Reopened Case 11,280.

MR. CARROLL: In the matter of Case Number 11,280 being reopened pursuant to the provisions of Division Order Number R-10,389, which order created the South Black River-Delaware Pool in Eddy County, New Mexico, and promulgated temporary special pool rules therefor.

EXAMINER STOGNER: At this time I'll call for appearances.

MR. HALL: Mr. Examiner, Scott Hall of the Santa Fe office of the Miller, Stratvert, Torgerson and Schlenker law firm.

I have three witnesses this morning.

We would also ask that this matter be consolidated with Case Number 11,447 for purposes of testimony.

EXAMINER STOGNER: Are there any other appearances in Case 11,280?

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr and Berge. I would like to enter our appearance in this case and in the subsequent case for Chevron USA Production Company.

We do not intend to call a witness. I have a statement to read on behalf of Chevron at the conclusion of the case in support of the Application of Enserch.

EXAMINER STOGNER: If there's no objection, then at this time Case Number 11,447.

MR. CARROLL: Application of Enserch Exploration, Inc., to amend special pool rules for the South Black River-Delaware Pool, Eddy County, New Mexico.

EXAMINER STOGNER: Other than Mr. Hall or Mr. Carr, are there any appearances in this matter?

Mr. Hall, I assume the three witnesses are also going to appear in this matter?

MR. HALL: Yes, sir.

EXAMINER STOGNER: Okay. Would the witnesses please stand to be sworn?

(Thereupon, the witnesses were sworn.)

MR. HALL: We would call Jerry Anderson.

JERRY R. ANDERSON,

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

DIRECT EXAMINATION

BY MR. HALL:

Q. For the record, please state your name and your place of residence.

A. My name is Jerry R. Anderson. I reside at 4325

Las Robles in Plano, Texas.

Q. And by whom are you employed and in what capacity?

A. I'm employed with Enserch Exploration as a regional landman.

Q. And Mr. Anderson, have you previously testified before the Division and one of its Examiners and had your credentials accepted and made a matter of record?

A. Yes, I have.

Q. And are you familiar with the Applications in these matters and the subject lands?

A. Yes, I am.

MR. HALL: Mr. Examiner, are the witnesses credentials acceptable?

EXAMINER STOGNER: They are.

Q. (By Mr. Hall) Mr. Anderson, if you would, briefly state what it is Enserch is asking by its Application.

A. We're seeking an order to provide for a 20,000-to-1 GOR, gas-oil ratio, in preparation for the recompletion of the Murchison State "2" Number 1 well, to be completed in the upper level of the Brushy Canyon Delaware, and that's located at approximately 4800 feet. And we also propose to present evidence relative to the establishment of permanent pool rules for the South Black

River-Delaware Pool.

Q. Is Enserch recommending further development on 40-acre spacing for the pool?

A. Yes.

Q. If you would, please, sir, refer to Exhibit 1 and identify that and review it for the Examiner.

A. Exhibit 1 is a map showing the offset operators within two-mile radius. It also shows the -- has the well spotted and the Delaware pools that are inside that area.

Q. Is the Enserch acreage highlighted in red?

A. Yes, it is.

Q. Are you the individual who's responsible for identifying the operators of all wells and owners of unleased mineral interests within a mile of the subject lands?

A. Yes, I am.

Q. In conjunction with that, did you direct a search be conducted of public records in Eddy County and at the BLM to determine that ownership?

A. Yes, we checked federal, state and county records to determine the ownership.

Q. And Exhibit 1, was it prepared at your direction and control?

A. Yes, it was.

MR. HALL: Nothing further of this witness, Mr.

Examiner.

We would move the admission of Exhibit 1.

And by way of explanation, you'll note that the title block shows reference to the P-J Delaware field. Apparently the District Office had recently issued a letter indicating that the nomenclature of this pool now is the P-J Delaware, so that's made it onto the exhibits here today.

I don't know if the District Office letter is correct or not. Make sure we're singing from the same hymn book.

EXAMINER STOGNER: You threw me for a loop on that one. Okay now, you said that's the P-J Delaware, and that's what the nomenclature is known?

MR. HALL: The Order establishes this as the South Black River-Delaware, and that's the nomenclature on the Order.

Apparently the District Office recently issued a letter saying this is the nomenclature for this pool. Now, I have not seen that letter, but it went out to industry, and that's why the exhibits refer to P-J Delaware. I just wanted to point that out for the record. We're talking about the same acreage described in the Order as the South Black River-Delaware.

EXAMINER STOGNER: You wouldn't happen to have a

copy of that letter, would you?

MR. HALL: I have not seen it.

THE WITNESS: No, we don't, not with us.

RALPH NELSON: We do not have it.

EXAMINER STOGNER: Okay. Subsequent to that hearing, I'll have to see what's going on on that.

However, I am going to refer at this time to Order Number R-10,389, which declaratory paragraph number 2 essentially contracted and deleted certain acreage in the P-J Delaware Pool for the creation of this particular pool.

Now, that was done under an application brought on by Dalen Resources Oil and Gas Company in May of 1995

It's possible that the District Office wasn't aware of this, because it went outside of the regular nomenclature proceedings. I'm just speculating at this point, of course, but I know we do have a new personnel down there, a geologic, that may not be aware of it.

However, that should not change the scope of today's case, because we are talking about the South Black River-Delaware Pool, which had special pool rules and a special allowable; is that correct? Under authority of this order?

MR. HALL: That's correct, and you should know that Enserch acquired Dalen Resources Oil and Gas effective January of this year, and they are the successor operator

to the subject well in this particular acreage.

That earlier application was for the establishment of rules for new discovery pool, and those lands were contracted out of the P-J Delaware Pool, that is right.

Note also that the Byram Service describes the South Black River-Delaware Pool incorrectly. I think they picked up the description for the contracted-out acreage. So we're all wrong.

EXAMINER STOGNER: All righty. So Byram's has it described wrong. Thank you for bringing that to my attention. I'll try to get everybody's nomenclature brought into line.

MR. HALL: Thank you. That concludes our direct of Mr. Anderson.

We would move the admission of Exhibit 1.

EXAMINER STOGNER: Exhibit Number 1 will be admitted into evidence at this time.

I assume, Mr. Hall, that your affidavit of mailing will be presented at a later time?

MR. HALL: We'll present that today.

EXAMINER STOGNER: But at a later time in today's case?

MR. HALL: Yes, sir.

EXAMINER STOGNER: Okay, let's discuss that at

this point. I'm assuming that the people that you have shown in your one-mile radius of this pool boundary is also represented with these affidavits.

MR. HALL: That's correct.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Anderson, what does the red mark indicate on your Exhibit Number 1?

A. That outlines the acreage that Enserch has an interest in.

Q. Okay. Now, what is your understanding of the pool boundary of the South Black River-Delaware Pool at this time?

A. The 40 acres surrounding the Murchison State "2" Number 1 well, the southeast quarter of the northeast quarter.

EXAMINER STOGNER: I have no other questions of this witness. You may be excused.

MR. HALL: Call Ralph Nelson at this time.

RALPH NELSON,

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

DIRECT EXAMINATION

BY MR. HALL:

Q. Mr. Nelson, for the record, state your name and

place of residence.

A. I'm Ralph Nelson. I'm at 5501 Oak Hills Drive, Colleyville, Texas.

Q. And for whom do you work and in what capacity?

A. Enserch Exploration as a staff geologist.

Q. And have you previously testified before the Division, one of its Examiners, and had your credentials made a matter of record?

A. Yes, sir, I have.

Q. And are you familiar with the lands that are the subject of these combined Applications and the subject well?

A. Yes.

MR. HALL: Mr. Examiner, are the witness's credentials acceptable?

EXAMINER STOGNER: They are.

Q. (By Mr. Hall) Mr. Nelson, if you would, provide Mr. Stogner with an overview of the geology of this particular reservoir.

A. Well, on Exhibit 2, this map will show the -- a Brushy Canyon sand at the 4800-foot level. This sand is representative of the Brushy Canyon sands in this area.

The general trends are from the northwest to the southeast. These are deep-water fan channel sands whose source is to the northwest, approximately 15 miles.

Generally in this area, these sands will tend to stack, these channels will tend to stack, and I believe we'll show that in a later exhibit.

Q. All right. If you'd like to refer to Exhibit 3, that's your cross-section.

A. Exhibit 3 is a cross-section that runs between the Enserch Murchison State "2" and the Chevron Number 7 Marquardt Federal. Half of this cross-section was previously submitted in the earlier hearing, that being the Murchison State 2, both the density neutron log and the mud gas log sections that you see.

The pay in the Murchison State Number 1 is in the basal Brushy Canyon interval. We have identified sands A, B and C.

Also colored there in A and B is green on the porosity side. We believe those sands to be oil productive. We are not sure, we believe there's a possibility that the C sand is gas-bearing because of the three to three and a half times increase in the mud gas log and the density neutron separation.

Also on these wells, this cross-section, you'll see the 4800-foot sand. Chevron attempted a completion in the basal Brushy Canyon sand and was unsuccessful and has moved up to the 4800-foot sand. They have frac'd it and had a flow test of 60 to 100 barrels a day and 800 to 900

MCF and 800 barrels of water. It's not officially been potentialed, but it is currently shut in, waiting on a disposal well.

We have a similar interval in the 4800-foot sand in the Murchison State Number 2 [*sic*]. Perhaps -- It is a little thicker, and it has better porosity development. It also has a good mud gas show.

Q. All right. With respect to the other well, the Chevron Marquardt well, does it appear that the C sand you described is also present in the Marquardt well?

A. It appears that there is perhaps an equivalent interval in the C sand. However, the C sand in that well is very much lower porosity, with the exception of one little two-foot stringer at the base, and that two-foot stringer corresponds and correlates to a high gas kick on the mud gas log in the Chevron well also.

Q. All right. The fact that the C is not as prevalent in the Marquardt well, does that indicate to you that that particular sand is more of a discontinuous nature?

A. Very much so. We see that in other wells that have been drilled in this immediate area. C sand is not present in these other wells in a similar way as it is here.

Q. All right. These C sands, are they lenticular in

nature?

A. Very much so.

Q. All right.

A. Very discontinuous.

Q. With respect to the 4800-foot sand in the Murchison State well and then over on the Marquardt 7 well for Chevron, what does that tell you? The fact that it shows up in both logs prevalently, does it indicate that there is homogeneity in the reservoir for that section?

A. It appears that this is a much more continuous sand. It's a much more massive sand, it's more widespread across the area. It is potentially the better pay in the area.

Q. All right. Anything further with respect to Exhibit 3?

A. No.

Q. Let's refer to Exhibit 4, if you would explain that to the Hearing Examiner.

A. Exhibit 4 is a structure map from the top of the base of the Brushy Canyon sand with an isopach overlay, net porosity isopach greater than 12 percent overlay, and the Murchison State Number 2 shown there is the thickest net porosity well in the area, as we have seen.

The Chevron Marquardt well is approximately a third as thick, and note there are no other wells nearly as

thick, perhaps, except for one down in the southeast of the southwest of 1.

Q. All right. Do Exhibits 2 and 4 show the known extent of the limits of both the upper and lower sands?

A. Yes, they do. And they also both show how these sands tend to stack as the isopach for both sands appears to be in approximately the same positions.

Q. Would you explain why Enserch is seeking an increase in the GOR limitation to 20,000 to 1?

A. Well, in the production of the Number 1 Murchison State "2", which Mr. Strickland will discuss in detail later, the GOR has increased in producing in the range of 13,000 to 19,000 GOR.

The Marquardt well also tested in a range that was in the 9000 to 15,000 range. We feel like that is the nature of these reservoirs.

Q. All right. With respect to the 4800-foot sand, is there any likelihood of drainage across Enserch's lease line from the Chevron well?

A. The Chevron well is drilled 330 feet off the line from our leases. Our side wall core porosities in the 4800-foot sand, as well as their side wall core porosities, indicate that is the most permeable sand between the two sand intervals.

Since we have not perforated the well and

production-tested the well, we don't have, really, any information to say that it is or it isn't.

Q. You cannot preclude that there will be drainage, then?

A. That's correct. It is a porous and permeable sand.

Q. Does your data continue to confirm that reserves can be most efficiently and economically drained on 40-acre spacing?

A. Yes, especially in the basal Brushy Canyon sand, because of the discontinuous nature of these sands. And also producing these two sands together would be more economical, rather than separate completions.

Q. All right. And separate allowables -- Would it make sense to be producing these through separate allowables, separate wells, separate tubings?

A. No. No, it would make more sense to produce them economically, as in one completion.

Q. All right. In your opinion, will the establishment of permanent pool rules with an allowable set at 250 barrels of oil per day and at 20,000-to-1 GOR limitation be in the interest of conservation, the prevention of waste and the protection of correlative rights?

A. Yes, it would.

Q. And were Exhibits 2 through 4 prepared by you or at your direction?

A. Yes, they were.

MR. HALL: That concludes our direct of Mr. Nelson.

We would move the admission of Exhibits 2 through 4.

EXAMINER STOGNER: Exhibits 2 through 4 will be admitted into evidence.

Mr. Carr, your witness.

MR. CARR: I have no questions, Mr. Examiner.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Nelson, as far as the production off that Chevron well, adjacent -- that's the Number 7 Marquardt Federal well -- are those perforations blocked off at present, as shown on your Exhibit Number 3, or are they producing simultaneously, that upper and lower interval?

A. No, there's a cast iron bridge plug set at 4900 feet, so they have shut off those perforations, the lower perforations.

Q. Lower perforations. And the -- Only the upper perforations --

A. Yes.

EXAMINER STOGNER: Mr. Hall, I have no other

questions of Mr. Nelson at this time.

MR. HALL: All right. At this time we would call Greg Strickland.

GREG STRICKLAND,

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

DIRECT EXAMINATION

BY MR. HALL:

Q. Mr. Strickland, for the record would you state your name and place of residence, please, sir?

A. Greg Strickland. I live in Dallas, Texas.

Q. And by whom are you employed and in what capacity?

A. I'm employed by Enserch Exploration in the capacity of petroleum engineer.

Q. All right. Have you previously testified before the New Mexico Oil Conservation Division?

A. No, I have not.

Q. If you would, please, sir, give the Hearing Examiner a brief summary of your educational background and work experience.

A. I graduated from Texas A&M University with a bachelor of science in petroleum engineering in 1980. I became employed for Enserch Exploration in 1981 as a petroleum engineer and have worked there continuously for

the past 15 years.

And I'm also a registered professional engineer in the State of Texas, in the specialty of petroleum engineering.

Q. Have you testified before the Texas Railroad Commission?

A. Yes, sir, I have.

Q. Are you familiar with the Application Enserch has filed in this case and the subject pool in the Murchison State 2?

A. Yes, I am.

MR. HALL: Mr. Examiner, we would offer Mr. Strickland as an expert petroleum engineer.

EXAMINER STOGNER: Mr. Strickland is so qualified.

Q. (By Mr. Hall) Mr. Strickland, if you would, please, refer to Exhibit 5 and explain what this is intended to reflect to the Hearing Examiner.

A. Exhibit Number 5 is an exhibit initially submitted in the past proceeding. It is a PVT analysis performed by Core Laboratories. The sample was taken from our discovery well, the Murchison State "2" Number 1, after about ten days of stabilized flow.

The significant things to note on that exhibit are the relative oil volume or formation volume factor of

1.5, the solution gas-oil ratio of 1051 toward the bottom of the page, and the API gravity of the oil of 45.5 degrees API. This is indicative of a black oil reservoir.

Q. Does it also tell you whether or not this is a solution gas drive reservoir?

A. Yes, this would be a typical oil sample for a solution gas drive mechanism.

Q. All right. And what was the GOR at discovery?

A. The GOR at discovery was 1051. From the sample, we initially began producing at a GOR of around 8000 to 1.

Q. Is the producing GOR higher now?

A. Yes, the producing GOR has been much higher. In fact, the producing GOR has ranged over the last several months from 4700 as the low, up to a high of 19,200.

Q. All right. And does this tend to confirm the existence of a solution gas drive?

A. Well, it confirms the existence of a combination drive, a solution gas drive, depletion gas drive, and water encroachment.

Q. All right. If you would refer to page 2 of Exhibit 5. And I'll note to the Examiner, the bottom of page 2 is marked page 5; I'll ask you to ignore that.

But the second page of Exhibit 5 is the "Composition of Primary Stage Separator Gas". What is that intended to reflect?

A. What we're trying to identify here, this is the sample of the separator gas taken at the same time the oil sample was taken under the same conditions, and this is the sample of separator gas showing a plant product yield of 5.432 gallons per MCF. We're showing a gross heating value of 1208 and a specific gravity of .73. This would appear to be a gas-reservoir gas sample.

Q. And what is the primary source for this gas? Which interval?

A. We believe that this gas sample is dominated by the presence of the gas seen in the C sand, which was described by Mr. Nelson to be the primary gas-bearing sand in the completed interval.

Q. All right. If you would refer to page 3 of Exhibit 5 and explain what this is intended to demonstrate.

A. Page 3 is a comparison of gas samples taken from four wells in southern Eddy County, in Brushy Canyon completions, similar to our discovery Murchison State "2" Number 1, and the White City field.

The two columns on the right are from the La Huerta and East Loving fields, and they show heating values ranging from 1400 to 1500 BTUs, and they show plant product yields ranging from 11 to 13 gallons per MCF. Those are more typical of black oil systems, solution gas drive mechanisms dominating the oil production.

Contrast that with the two columns to the left, which are taken from the East Herradura Bend field and the White City field, or what we're calling White City on the exhibit. The heating values there are from 1170 to 1200 BTUs. The plant product yield, respectively, is 5.4 and 5.0. That's showing a leaner mixture with the dominance that we mentioned earlier of the gas presence.

And in fact, we realize that in the Santa Fe Federal lease of East Herradura, a situation similar to ours occurred wherein Ray Westall completed two zones of porosity by perforating directly, which he thought to be oil zones, did not perforate a presumed gas zone, and fractured into a gas zone. Hence, the presence of the high gas composition, similar to our situation.

Q. All right. Let's refer to Exhibit -- now, if you would, please, sir, and explain what this exhibit is intended to demonstrate.

A. Okay.

Q. Exhibit 6.

A. Okay, Exhibit 6? On Exhibit 6 we're showing the production from our particular well, the Murchison State 2 Number 1, since it began producing in April through November of 1995. We have a graphical presentation on the first page, followed by a tabular description of the production on the second page.

On the graphical presentation, the top line, the black line, is the gas-oil ratio. The red line is the gas produced, green is oil and blue is water.

As you notice, on the black line we started out producing at a GOR of around 8000 to 1 and rapidly increased up to a GOR from 17,000, 19,000 to 1, and then decreased down to 10,000 and 4000 to 1, respectively.

You can also see, similarly, that the gas production reached a peak and then began a decline.

So we have a range of GOR production exhibited on the graph.

Q. All right. Is the current gas producing rate an accurate indication of the actual gas-oil ratio of the hydrocarbons at reservoir conditions?

A. Yes, we believe that it is.

Q. Do you have any plans for putting the Murchison State 2 on pump?

A. Yes, as you can see, that the rapid decline in production, we believe, is due to fluid loading. And in fact, if you look at the June-through-August period, it was producing on a daily basis -- in June it only produced 23 days, but during June it was producing about 148 barrels of oil, 1.4 million cubic feet of gas, and about 257 barrels of water per day.

In August it was producing on a daily basis at

868 MCF and about 50 barrels of oil per day and 220 barrels of water.

After that time, September, October and November, the oil production fell off dramatically. The gas production also demonstrated a sharp decline as the water production fluctuated.

We believe that the sharp decline in the gas rate is not providing enough velocity to continuously unload the high volume of fluids present in the well from both water and oil.

We hope that when we put the well on pump -- which we are in progress of placing the well on pump, and today is probably the first full day of pumping activity on the well -- we hope to get the production rate back up to 50 to 100 barrels of oil per day.

Q. All right. What would you anticipate the production to be at the 20,000-to-1 GOR limitation?

A. We think that the production rate will be between 50 and 100 barrels a day.

Q. All right. Do you believe the production at the 20,000-to-1 limitation to be the ultimate appropriate GOR at which this well should be produced?

A. Yes, I do.

Q. And why do you need that higher limitation?

A. We need that high limitation in order to

efficiently and economically extract the hydrocarbons from the well.

Q. All right. Will production at the higher rate deplete reservoir energy excessively or prematurely?

A. No, we do not believe that it will.

Q. Mr. Strickland, is there any way to complete these wells in the lower section to avoid frac'ing through to the C sand so you can avoid a high-GOR situation to begin with?

A. No, there are not. The Brushy Canyon, as has been demonstrated numerous times in this agency as well as through the literature, has minimal barriers that would impede frac growth. You have seven-, eight-foot shale stringers isolating these sands. And in fact, looking at the cross-section Mr. Nelson showed, there was excessive frac growth in the Chevron well.

We feel that you cannot isolate the perforation placement and stay out of adjacent sands that might contain different hydrocarbon constituents, as was demonstrated in the Herradura case, and as we have in fact experienced in the Murchison State "2" Number 1.

Q. All right. If you would refer back to Exhibit 5, beginning with page 4 of Exhibit 5, it's labeled "Santa Fe Federal Lease - 8 Wells"?

A. Yes.

Q. If you would review that for the Hearing Examiner and explain what that evidence demonstrates.

A. We feel that the Herradura Bend-East Brushy Canyon field is the analog for our situation, and this is a plot of gas-oil ratio versus cumulative oil production for an eight-well lease, the Santa Fe Federal lease.

You can see that the GOR reached a peak of 25,000 to 1, which is atypical of a solution-gas-drive-dominated production scenario. It began a decline down to a 5000-to-1 level after production of about 153,000 barrels of oil.

We feel that the gas sand depleted rapidly, but however, as the gas zone was present, it did dominate the GOR, opposed to a typical solution GOR where the gas-oil ratio increases over the life of production.

Q. All right, let's refer to the next page, page 5 of Exhibit 5. If you would explain that page?

A. On this page, in Exhibit 5, this is a production plot of the same eight wells on the Santa Fe Federal lease. The top curve is the gas curve, the solid line is the oil curve, the light dashed curve is the water curve.

And it just goes on to show that as the gas production reached a high of 250 million cubic feet per month in late 1992, oil production was at 10,000 per month, the oil production and gas production were both declining somewhat, you experienced a slight flattening through

midway of 1993 as the oil also began to decline. It just goes ahead and confirms the GOR presentation on the previous page.

Q. By the way, these plots are for the entire field, are they not? They are not limited to a single well?

A. They're limited -- This plot is limited to eight wells on the Santa Fe Federal lease.

Q. All right. And you have some updated plots now?

A. Yes, I do, I have some updated plots.

Q. All right. Let's refer to Exhibit 7, please.

A. Exhibit 7 is a continuation of the Herradura Bend-East Delaware field, and it encompasses all wells in the field which were completed, presumably in similar manners. There again, we're going with the same color scheme, red being gas, black being GOR, oil being the green curve and blue being the water curve.

And this goes on to show the gas domination of a nontypical solution gas drive system where the GOR on the field basis reached a maximum of 17,000 to 1 and then began to decline over time, and has -- is presently at about 4000 to 1. And that's through August of 1995.

Q. All right, let's refer to Exhibit 8, if you would explain that exhibit.

A. Exhibit 8 is a contrasting exhibit.

As you recall from our gas analysis comparison,

we said that the Loving, Loving East fields were more typical black oil systems, solution gas oil systems. And there you see, on this decline curve, using the same color scheme, an increasing GOR over the life of the field. You see it beginning at a low point of 2000 to 1, increasing up to 10,000 to 1 over the life of the production.

We do not think this is the system we had in place, but we think this is the model of a typical solution gas oil drive system.

Q. All right. Now, with respect to the Murchison State "2" well, do you anticipate it will be necessary to fracture-stimulate the 4800-foot oil sand?

A. Yes, we do believe we'll have to fracture-stimulate the 4800 sand, as we did the basal Brushy Canyon, in order to achieve commercial production rates.

Q. And when you include production from the 4800-foot oil sand, what do you expect the maximum reasonable oil rate to be?

A. We expect that based on the greater porosity present in our well, where we had 47 feet of net pay compared to the Chevron well having 32 feet, and with the better permeability present in our well, that we could have rates approaching 150 to 200 barrels of oil per day.

Q. And is that porosity demonstrated in Exhibit 3?

A. Yes, it was. It's demonstrated on both the

cross-section and on the isopach map presented by Mr. Nelson previously.

Q. Is there any new evidence that you've seen to suggest that a single gas cap is present in this reservoir?

A. No, there is not.

Q. All right, if you would refer back once again to Exhibit 5 and page 11 of that. It's the initial production data information. What is this intended to demonstrate?

A. This is a spreadsheet of the first month and a half of production from the Murchison "2" Number 1. In the left column you have oil, water, gas, GOR and flowing pressure.

We produced the well initially at a -- several different flow rates and a few choke configurations.

One thing that's interesting to note, though, is, production at the state-regulated oil system -- or the state-regulated GOR of 2000 to 1 is shown on April 26th and April 27th.

There we choked back the well to a 2000 to 1 at a depth bracket allowable of 107 barrels of oil per day, would give us a gas production of roughly 200 MCF per day.

When we put the well on an 8/64 choke and produced 203 MCF, we produced six barrels of water and six barrels of oil.

The next day we increased the choke slightly to a

9/64. We experienced 213 MCF. However, we produced no fluid whatsoever.

The point here is that the well will not lift any fluid at the 200-MCF-per-day rate and the state GOR limitations of 2000 to 1.

Q. All right. Let's refer to the next page of Exhibit 5, and explain that, please, sir.

A. In Exhibit 5, the last page of this package is a summation of the economic analysis that was previously performed for the Murchison State "2" Number 1. There, we compared the impact of producing the well at 107 barrels of oil per day, a 2000-to-1 GOR, we compared it to producing case 2, 107 barrels a day at 10,000 to 1, and case 3 is 250 barrels a day from both the basal Brushy Canyon and the 4800 sand at a 10,000 to 1.

The important thing to note is, cases 1 and 2 are just the basal Brushy Canyon. If we produced at the 2000-to-1 GOR we would have a well payout of 64 months, to recover 80,000 barrels, which is a poor economic venture.

Conversely, if we produced the well at the 117 barrels of oil per day at the 10,000-to-1 GOR, we had a payout of nine months.

And at 250 barrels a day, as you would expect, the payout decreased down to six months.

And the reserve values were obtained by using

volumetric calculations for a 40-acre area of reservoir rock at the prescribed porosities, water saturations and thicknesses.

Q. All right. Are you able to project the economic scenario using the 20,000-to-1 GOR limitation?

A. No, that work has not been done.

Q. All right. Again, for purposes of explanation, the exhibit refers to the White City Brushy Canyon field. In fact, we're referring to the South Black River-Delaware field. Is this the same -- ?

A. Yes, this exhibit refers to the same area and refers more specifically to the Murchison State "2" Number 1 well in that field, whatever the name might be.

Q. Mr. Strickland, in your opinion, are the 250 barrels of oil per day allowable and the 20,000-to-1 GOR limitation reasonable and necessary to efficiently and economically develop this field?

A. Yes, they are.

Q. In your opinion, if the wells in this pool are produced under the 10,000-to-1 GOR limitation, is there a likelihood that the liquids cannot be economically produced and ultimate recoverability of liquids will be impeded?

A. Yes.

Q. Likewise, if the wells are produced under the statewide rules, 2000 to 1, with the standard depth bracket

allowable, the 107 barrels of oil, will recoverability be substantially reduced?

A. Yes, we believe this to be the case.

Q. Will the continued operation at the lower GOR limitation result in any cross-communication in the oil zone?

A. No, we do not believe that any cross-communication in the oil zone will occur by producing in the manner that we are prescribing.

Q. That's at the higher GOR?

A. At the higher GOR limitation.

Q. All right. Do you expect that there will be gas migration among the zones in any event?

A. The only event that there might be gas migration would be in the shut-in state.

But as long as we continuously produce the well at the higher GORs and at the expected allowables, we do not anticipate any cross-feeding of gas or oil.

Q. Is development on 40 acres appropriate for this pool?

A. Yes, the 40-acres development is appropriate primarily because of the heterogeneity of the sands, the sand absence in the Chevron well and the sand presence in our well.

Q. All right. In your opinion, will granting

Enserch Exploration's Application be in the best interests of conservation, the prevention of waste and the protection of correlative rights?

A. Yes, I believe it is.

Q. And are you recommending that the temporary pool rules for the pool with a 20,000-to-1 GOR limitation be made permanent?

A. Yes, I am.

Q. Were Exhibits 6 through 8 prepared by you or at your direction?

A. Yes, they were.

Q. And you've reviewed Exhibit 5 for the Examiner, and we understand this was an exhibit presented in the earlier case.

Have you reviewed the information in that exhibit and believe it to be accurate?

A. Yes, I have.

MR. HALL: All right. We would tender Exhibits 5 through 8.

And that concludes our direct examination of Mr. Strickland.

EXAMINER STOGNER: Exhibits 5 through 8 will be admitted into evidence at this time.

Mr. Carr?

MR. CARR: No questions of Mr. Strickland.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Strickland, in referring to your Exhibit Number 6 --

A. Yes, sir.

Q. -- this is a historical backdrop of the Murchison "2" State Well Number 1 production. Was that production curtailed any during the past -- what? -- year and half of production, because of overproduction of gas allowable?

A. No, sir, it was not curtailed, and it's about nine months of production. There was no curtailment. The well was flowing at choked rates through October, at which point we removed any chokes. But we're just basically flowing the well in a prudent manner.

After the Commission granted the allowables and the provisions for the temporary field rules, there was no restricted flow that I'm aware of.

Q. Would this well, if it had continued with the statewide 2000-to-1 gas-oil-ratio, would it have been curtailed with that GOR?

A. At 2000, the well would lift -- it would be curtailed significantly, and we would be able to lift minimal fluid. And in fact, that the 2000 to 1 -- If you go back to the exhibit, the tabular sheet that has the daily production rates --

Q. That's your Exhibit Number 5?

A. Yes, page -- It's the second to the last page.

Q. Second to the last page.

A. The 2000-to-1 rate would be 2000 times 107 depth bracket. But as you notice, we were producing 200 MCF per day and six barrels of oil, which calculated to a 34,000-to-1 GOR.

So we were unable to lift -- We were highly gas dominated at the 2000-to-1 GOR rate, and we needed to increase the gas flow to reduce the GOR, if that addresses your question.

Q. Yes, it does. But still, at the same time, if your production wasn't curtailed, why are you still seeking the 20,000-to-1 GOR?

A. Well, as you can see from July to October on the exhibit showing the tabular production of the "2"-1 and the graph, we were producing at 17,500 and at 19,200 in September. At that point in time -- which is higher than the 10,000 to 1 that we were asking for earlier.

And what we're seeking is no curtailment or no reduction in the productive capacity of the well. As was mentioned, in Herradura it reached a 25,000 to 1 and then began to decline.

We don't expect it to stay at 25,000 to 1, although we're not sure. We feel like that the gas will

decline as we deplete that gas sand, and that gas and oil rates will decline over a period of time.

But if we produce it at 10,000 to 1, where it was in October, we feel that that GOR was impacted by fluid loading. And as you can see by the production of over 100 barrels per day of water, we are experiencing a significant amount of fluid loading.

And as we put the well on pump and continue to pump the well, we hope that we'll obtain the 50 to 100 barrels a day. If we pump it slowly, perhaps the gas rate could reach the 1.2 million or higher gas rates. It will be a semi-flowing pumping situation.

In order to continuously remove fluids, though, we need to have a pump or some form of artificial lift on the well.

And we don't want to restrict the productive capability by enforcing the 10,000-to-1 temporary GOR or reverting back to the 2000 to 1, which we think will be detrimental to recoveries and detrimental to the economic recovery of the hydrocarbons.

And we feel that in the near term, after we get stabilized performance from the basal Brushy Canyon zone, it may be appropriate at that time to perforate and stimulate the 4800 zone, which we think will have a lower GOR but could have substantial oil production, based on the

good porosity development and permeability in the 4800 zone.

So we're seeking a cushion up to the 250 allowable, and we're seeking removal of any barriers to full production capacity from the well, from the 4800 zone at some point in time in the future, and the existing basal Brushy Canyon zone that we currently have open to production, however it's impeded by fluid loading.

Q. Is it also your contention on Exhibit Number 6 -- well, okay, I'm referring to Exhibit Number 6 and Exhibit Number 8 in this question -- that continued production of this well could see a flattening out and also an increase of the GOR like you have in Exhibit Number 8, which represents the Loving and Loving East Pool production?

A. It could. It's possible that as the gas sand is depleted, we might see a rise in the GOR at that point in time. And it could reach the 10,000 level or higher.

And there again, the 20,000-to-1 GOR, we do not think, causes any waste. It damages no one, it's the -- It's not causing any reservoir energy premature dissipation.

It's primarily allowing the gas zone to produce unimpeded, and the GOR could increase to 10,000 to 1, or it may increase to a higher level. We're trying to remove any roadblocks to production.

Q. As far as the Exhibit Number 8, that represents -- Is that a solution gas drive, or a depletion gas drive, or is it a combination of all three?

A. Well, Exhibit Number 8, we think, is dominated by a solution gas drive. It's got the increasing GOR as you produce the well, the oil production is declining. You can see a fairly flat decline on the green line, following 1990, late 1990, early 1991, it's declining at an exponential decline rate of about 15 percent, and the gas is relatively flat.

And that decreasing oil and flat gas production causes that increased GOR, and that is typical of most solution gas drive systems.

Q. And that's your contention, that this pool mirrors that particular production type or production reservoir as you are exhibiting in Exhibit 8?

A. Well we actually feel that Exhibit 7 is more analogous to our situation in the Murchison State, and Exhibit 7 was the Herradura Bend East field, which I believe in 1990, Case 10,541, was -- 10,541, I think, was the case number.

But there they testified that they had two oil zones sandwiching a gas sand. They perforated directly the oil sands, frac'd into the gas zone. They had a higher GOR initially, and it was -- It was a departure or deviation

from the norm.

And we feel like that's probably what we have here. We had the C gas zone that we frac'd into, we have a higher GOR quite early in the well life.

In the Loving East, they were down to 2000 to 1 and gradually increased up to 10,000 to 1.

Here we started off at 8000 to 1 and jumped up to 19,000 to 1 quite rapidly.

So we feel like -- we may have -- We may have a gradual jump up to this 17,000, 19,000 level, and we may decline back downward. However, we also have the change that as we complete the 4800 sand, which we expect to have a lower GOR, we could have a combination effect.

Q. What's the status of the other three wells down in the southeast quarter of Section 2? I mean, you have the State Number 2 drilled; is that correct? Are you drilling it at this time?

A. We have a State Number 4 drilled and we have a State Number 3 drilled. The State Number 2 --

MR. NELSON: State Number 2 drilled.

THE WITNESS: State Number 2 drilled? Okay, not the Number 3. Yeah, that's right, we have the State "2"-2 and the State "2"-4 drilled.

The State "2"-4 is shut in, and we are presently -- we tested the basal Brushy Canyon in the State

Number "2"-4; it was marginally productive. We are in present operations of attempting to examine the well for conversion to a saltwater disposal well to handle the water produced from the State "2" Number 1.

And then we would also take the production from the State "2" Number 2. The State "2" Number 2 is a basal Brushy Canyon completion. It's producing about 20 barrels a day on pump and about 100 MCF of gas and about 150 barrels of water. They are poorer producing wells than the Murchison State "2" Number 1.

Q. In those areas where the Brushy Canyon is not present, but should the 20,000 to 1 be approved, in those areas, where the 4800-foot sand is produced and somebody comes in and is capable of an increased gas-oil ratio because that would also follow through in those areas, would there be any detriment or potential detriment to that production, higher GOR?

A. No, we do not feel that that would be the case.

EXAMINER STOGNER: Any other questions of this witness?

MR. HALL: No, sir.

EXAMINER STOGNER: You may be excused.

Mr. Hall, do you have anything else further?

MR. HALL: Mr. Examiner, we'd also offer our Exhibit 12, which is our affidavit showing notice of this

hearing to interest owners and operators.

And we'd also ask the Examiner to take administrative notice of the previous testimony offered in Case 11,280.

And also, I would note that Unit Production Company is an interest owner in Section 36. They have authorized me to state that they support Enserch's Application here today.

And that concludes our case.

EXAMINER STOGNER: Okay, with -- I'll take administrative notice of the previous case in this matter.

And also in reviewing the docket, I see that Case 11,401, which was a nomenclature case, extended the P-J Delaware pool in Eddy County, New Mexico, to include the southeast quarter section too. I'll also take administrative notice on that and make any necessary -- or propose any necessary changes in this order, should it be approved, to straighten up the nomenclature.

Mr. Carr?

MR. CARR: Mr. Stogner, I have a statement I've been asked to present to the Division for Chevron USA Production Company.

It reads:

As an offset leasehold owner, Chevron USA, Inc.,

supports the Application of Enserch Exploration to amend the special pool rules for the South Black River-Delaware Pool to increase the GOR to 20,000 to 1. A 20,000-to-1 GOR more accurately represents the current producing GOR of the field and allows for economic development of the Delaware formation. Establishment of a 20,000-to-1 GOR will support the economic viability of Chevron's workover program in the South Black River field planned for 1996.

The statement is signed by Dave Rittersbacher, senior geologist for the New Mexico area.

EXAMINER STOGNER: Thank you, Mr. Carr.

Anything further?

Mr. Hall, I'm going to ask that you submit me a rough draft.

MR. HALL: Will do.

EXAMINER STOGNER: With that, if there's nothing further in either Case 11,447 or the reopened portion of 11,280, this case will be taken under advisement.

(Thereupon, these proceedings were concluded at 10:06 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 11280 (Reopened) and 11447, heard by me on January 11, 1996.

, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

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

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL January 13th, 1996.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998