NEW MEXICO OIL CONSERVATION DIVISION

EXAMINER HEARING

SANTA FE, NEW MEXICO

Hearing Date SEPTEMBER 18, 1997 Time 8:15 A.M.

NAME	REPRESENTING	LOCATION
[illegible]	[illegible]	[illegible]
TC Lowsley	"	"
Val Ott	"	"
Mike Wiskofske	"	"

ILLEGIBLE

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 MARATHON OIL COMPANY FOR POOL CREATION AND THE ADOPTION OF SPECIAL RULES THEREFOR, LEA COUNTY, NEW MEXICO

CASE NO. 11,853

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

September 18th, 1997

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, September 18th, 1997, 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.

* * *

I N D E X

September 18th, 1997
Examiner Hearing
CASE NO. 11,853

* * *

E X H I B I T S

Applicant's	Identified	Admitted
Exhibit 1	8	20
Exhibit 2	10	20
Exhibit 3	13	20
Exhibit 4	28	41
Exhibit 5	28	41
Exhibit 6	29	41
Exhibit 7	30	41
Exhibit 8	31	41
Exhibit 9	31	41
Exhibit 10	32	41
Exhibit 11	34	41
Exhibit 12	36	41
Exhibit 13	37	41
Exhibit 14	38	41

* * *

A P P E A R A N C E S

FOR THE DIVISION:

RAND L. CARROLL
Attorney at Law
Legal Counsel to the Division
2040 South Pacheco
Santa Fe, New Mexico 87505

FOR THE APPLICANT:

KELLAHIN & KELLAHIN
117 N. Guadalupe
P.O. Box 2265
Santa Fe, New Mexico 87504-2265
By: W. THOMAS KELLAHIN
and
TOM LOWRY
Attorney
Marathon Oil Company
P.O. Box 552
Midland, Texas 79702

* * *

WHEREUPON, the following proceedings were had at 8:15 a.m.:

EXAMINER STOGNER: This hearing will come to order.

At this time I'll call, on page 2, Case Number 11,853.

MR. CARROLL: Application of Marathon Oil Company for pool creation and the adoption of special rules therefor, Lea County, New Mexico.

EXAMINER STOGNER: Call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing in association with Tom Lowry, attorney with Marathon. We're representing the Applicant in this case, and we have two witnesses to be sworn.

EXAMINER STOGNER: Any other appearances?

Will the witnesses please stand to be sworn?

(Thereupon, the witnesses were sworn.)

EXAMINER STOGNER: Mr. Kellahin?

MR. KELLAHIN: Thank you, Mr. Examiner.

Mr. Examiner, you can see by Exhibit 1, which is a locator map, the area outlined in green in the west side of that display is the Monument-Abo Pool. It's an oil pool. It has a special 10,000-to-1 GOR.

You can see there's a line of cross-section

marked C-C', and for convenience, because so many of these wells have the same common name and a different number, we've numbered the cross-section with logs 1 through 12.

As you move to the eastern side of the cross-section on this display, there's an area outlined in red. That's the Skaggs-Abo Gas Pool. It's spaced upon 160 acres.

The topic of discussion this morning is the Hansen State 7 well, which is Well Number 4 in the northeast quarter of Section 16.

Marathon's request involves that well today, and despite its proximity to the Skaggs-Abo Gas Pool it, in fact, exhibits characteristics of production that are typical of the Monument-Abo Oil Pool.

Our technical presentation is an effort to demonstrate to you the practicality of establishing at this point a one-well pool, with the Hansen State 7 well being that well, and, with your permission, to produce that well at a daily oil allowable of 187 barrels a day, which is the depth bracket on 40 acres at this depth, but for a special rule for a 10,000-to-1 GOR.

You will find from the engineering presentation that, based upon step-rate tests, if this was limited to 2000 to 1, the only thing this well will produce is gas, while if we go up to a 10,000-to-1 GOR, it will produce

substantial quantities of oil.

To aid you in the presentation, you'll see the header on cross-section, there's some GOR numbers. Those are cumulative GORs for the wells. And we'll start, then, with Mr. Ott's geologic presentation so you can understand the geology in the area, and then we'll follow that up with the engineering presentation.

VALEN D. OTT,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Ott, for the record, sir, would you please state your name and occupation?

A. My name is Valen -- spelled V-a-l-e-n -- D. Ott, O-t-t. I'm a geologist with Marathon Oil Company in Midland, Texas.

Q. On prior occasions, Mr. Ott, have you testified before the Division?

A. Yes, I have.

Q. Pursuant to your employment as a geologist, have you made a geologic investigation of the facts surrounding this case?

A. Yes, I have.

Q. And based upon that investigation, do you now

have certain geologic conclusions about the appropriateness of establishing a new pool for Marathon's Hansen State Number 7 well?

A. Yes, I do.

MR. KELLAHIN: We tender Mr. Ott as an expert geologist.

EXAMINER STOGNER: Mr. Ott is so qualified.

Q. (By Mr. Kellahin) Let's go to Exhibit 1, Mr. Ott. The wells that Marathon operate are identified on this display in what manner?

A. They're identified on the line of cross-section C-C' as Wells Number 3, which would be the Bertha Barber Number 16 well, and Wells Number 4 and 5 which, respectively, would be the Hansen State Number 7 and the Hansen State Number 3.

Q. When we look at the display at that point, continuing down to Wells 6 and 7, the Britt wells, who operates those wells?

A. I believe Conoco operates those.

Q. Of the three wells shown on this display, do you recall which of the wells here in that section are still producing from the Abo?

A. As I recall, the only one producing would be Well Number 7 on the line of cross-section, which would be the Britt "B" Number 27.

Q. And then farther over on the right side of the display are the gas wells in the Skaggs-Abo Gas Pool, in the main portion of the pool?

A. That's correct.

Q. How many gas wells are still producing in the Skaggs -- are active in the Skaggs-Abo Gas Pool?

A. Four.

Q. Geologically, when we look at the Monument-Abo Pool and contrast that to the Skaggs-Abo Gas Pool and then fit the Hansen State 7 well within that geologic study, are these wells producing from the same portion of the Abo Pool?

A. No, they're not.

Q. In the Skaggs-Abo Gas Pool, which portion of the Abo Pool do they generally produce gas from?

A. The upper portion.

Q. And in the Monument-Abo Pool, where is that production?

A. Primarily from the lower portion of the Abo. However, they do have perforations open throughout the entire Abo interval.

Q. And then when we look at the Hansen State 7 well, where is that production taken from?

A. From the middle Abo.

Q. Okay. Let's set the locator map aside as an

index for our further discussion and have you direct our attention to what is marked as Exhibit Number 2. Would you identify that display for us?

A. It's the same base map as Exhibit Number 1, however there is a structure overlay upon that base map. The structure there is drawn on top of the Abo. Included with that structure -- with those structure contours, are control wells with their subsea elevations used to construct that structure map.

Q. When you look at the structure map, is there any geologic explanation based upon structure from which you can conclude that these three areas -- the Hansen State area, the Skaggs-Abo area and the Monument-Abo area -- are, in fact, dissimilar?

A. Yes, you can.

Q. In what way?

A. There are basically at least three structures out here, all approximately at the same structural elevation.

In the northwest portion of the map is the main Monument-Abo structure that has traditionally produced oil out of the Abo. That appears to be a separate and distinct structure.

At the Hansen State wells, there appears to be another small structure there which continues on to the southeast along that same structural trend.

And then separate and distinct from those two are the Skaggs-Abo structure, which would be in the east central portion of the map.

All of these appear to be at approximately the same structural elevation. There's maybe 50 feet of structural difference between the three structures.

Q. Okay. Let's set Exhibit 2 aside for the moment and integrate at this point the geologic information that you have analyzed and presented on the cross-section which is on the display board.

Let me ask you, sir, first of all, to give us a general characterization of the geology for the Skaggs-Abo Gas Pool, and I mean by that the gas wells in the far eastern portion of that pool, looking specifically at well logs numbered 8 through 12. What do you generally conclude?

A. I generally conclude that, based on where those wells produced, that the main producing interval is a thin bed near the upper part of the Abo formation. The Abo in the Monument area is in a back reef or shelfal position, geologically, therefore the nature of the rocks are such that they're thin-bedded, laminated, they have shale and siltstone beds between the thin-bedded carbonates, therefore providing barriers to fluid flow, both vertically and laterally.

Q. You've worked with Marathon's petroleum engineer, Mr. Mike Wiskofske, have you not, on this project?

A. Yes, I have.

Q. You're aware of discussions and information he has concerning the production characteristics of these various wells?

A. Yes, I am.

Q. Can you conclude geologically, based upon your knowledge of those producing characteristics, whether the Hansen State 7 well is part of the same common reservoir as the Skaggs-Abo gas wells in the eastern portion of the Skaggs Gas Pool?

A. I believe that they're not part of the same pool.

Q. Do you have evidence at this point as to whether the Hansen State 7 well is connected with the main Monument-Abo Pool?

A. I believe that it is not.

Q. Let's focus specifically, then, on Sections 15 and 16. This is where you're in proximity to the Conoco-operated well in 15? They appear to be the same portion of a structural feature. Do you see that?

A. Yes.

Q. Can you conclude geologically that the production from the Hansen State 7 well appears not to be affected by the production from the Conoco well?

A. It appears that it is not affected.

Q. Let's draw some comparisons so the Examiner can see the analysis that you've gone through. Let's go back to the cross-section and look at a comparison of two well pairs. In the Skaggs-Abo Gas Pool, let me have you give us the distinguishing characteristics between Well Log 9 and Well Log 12 and ask you to explain why you think those distinctions are significant.

A. With your permission, may I go up to the display?

Q. Certainly.

A. What I have shown here is the Abo, top of Abo formation is this blue horizon. And for each well on the line of cross-section I have drawn there where the perforations were placed in each of the wells, and also the date by which those wells were perforated, those specific intervals.

And the two wells that Mr. Kellahin would like me to compare are the Number 9 and the Number 12. You can see from the well log Number 9 that they perforated the well here in the upper Abo in 1985. Their primary zone appears to be this thin carbonate zone right here that's found both above and below my shales and siltstones, as can be seen by the gamma-ray log.

Well Number 12, this well also perforated that same interval a couple of -- or one year before, pardon me,

one year before this well. They also perforated a large interval in the middle and the lower Abo.

If we look at the well headers, we can see the cums up here. This well [referring to Well Number 9] cum'd 2.7 thousand barrels of oil, or 2700 barrels of oil, and 1.5 BCF of gas, with a GOR of 568,000.

This well [referring to Well Number 12] cum'd about 2100 barrels of oil and just over a BCF of gas with a similar of 485,000, yet it was perforated through most of the entire Abo.

I would conclude from that that most of the production in these two wells is, indeed, coming from this upper zone that you see perforated here.

Also, this Well Number 10 was perforated in that same zone, as well as perforations throughout the entire Abo, and again the cums and the GOR are somewhat similar.

Q. Let me have you make a comparison between the two Marathon wells, the well that's Number 3 in the Monument-Abo, compare that to Well 4, which is the subject Hansen State 7 well.

A. Well Number 3, as you can see on your locator map, is part of the Monument-Abo Oil Pool, and it's the Marathon Oil Bertha Barber Number 16. It was perforated in this interval, in the middle Abo, and currently produces about 130 barrels of oil and about 250 MCF of gas.

The well that we're discussing today, the Hansen State Number 7 well, Well Number 4 on the cross-section, you can see the perforations for that well, the same interval as the Bertha Barber Number 16. In addition, we've perforated three other intervals.

My colleague, Mr. Wiskofske, the engineer, will show you data that indicates that most of the production is coming from this set of perforations, Number 2, with some contribution from perforations Number 3 and Number 4, but predominantly from this interval.

My conclusion, comparing these two wells, is that the interval of production in Well Number 4, we're getting a slight contribution from the same interval as the Well Number 3, but predominantly from a different interval.

Q. Let's look directly at the immediate vicinity of the Hansen State 7 and ask you to make a comparison or distinguish the characteristics of the Hansen State, which is the Number 4 well, with the Conoco well, which is Number 7 on the cross-section.

A. The Number 7 well is this Conoco Britt "B" Number 27. The only interval open to perforations is this interval in the upper part of the Abo, which corresponds with the same producing interval as the other wells in this Skaggs-Abo gas field. It produced quite a bit of gas, a little over 5 BCF, and a significant amount of oil, about

132,000 barrels of oil.

It's perforated in a different interval from where the Hansen Number 7 is perforated and predominantly producing, which would be this interval. We do have perforations open in the upper part of the Abo, which would correspond to the same producing interval as the Conoco Britt "B" Number 27, however our data indicates that we're not getting much production from that interval.

I would also point out Well Number 5, which is an earlier well that Marathon drilled adjacent to the Hansen State Number 7, actually between the Hansen State 7 and the Conoco well. We perforated that same interval that produces in the Conoco well, this upper Abo interval, and tested that interval and it produced about 20 barrels of oil and a couple of hundred thousand MCF of gas. At the time we felt that was subcommercial, and we plugged the well back to a shallower horizon.

My conclusion, based on examining this data, is that there's a compartmentalization to this reservoir, that these wells in the Hansen state lease are not in the same producing interval as the Conoco wells, even though they may be stratigraphically similar. These wells seem to produce predominantly oil, whereas the wells off to the east produce predominantly gas.

Q. Compare the two Conoco wells, 6 and 7, now.

Describe for me your distinguishing characteristics and your conclusion.

A. Well, 6 and 7 are 40-acre offsets to each other. We've already discussed the Number 7, which had produced a little over 5 BCF of gas.

Conoco offset that well with this Well Number 6, which is the Britt "B" Number 28, and perforated it in the same interval. The well produced about 102 million cubic feet of gas before it was abandoned and a slight amount of oil.

My conclusion, based on examining this well, is that even though it was perforated in what appears to be the exact same stratigraphic interval, that apparently it's in a separate reservoir compartment and is not interconnected with this Britt "B" Number 27.

Q. Mr. Ott, you've described the compartmentalization of the Abo even in a two-well near area of relationship. What conclusions can you make about the vertical connections, if any, between these various Abo intervals that produce oil and/or gas?

A. Examination of both the open-hole logs and cores in the area lead me to conclude that there's very little vertical communication between the various producing horizons.

If you look at any of these logs, at the gamma-

ray, for example, the Marathon Oil Hansen State Number 3, note the very spiky nature of the gamma ray, indicating that there's a lot shale interbeds and soapstone interbeds. This is, indeed, what we see when we look at a core in the area. We're in a back reef or shelfal setting.

From a geologic perspective, that tells me that we're going to see thin beds with some shale or siltstone laminations in between. The porosity out here is generally quite low. Matrix porosities average about six to eight percent. They're generally quite tight, they don't give up much in the way of fluids. Only where you find good development of secondary porosity do you find production, and this secondary porosity, in my opinion, tends to be very patchy, very discontinuous. It can't be traced laterally for any great distance.

It is related to diagenesis, and diagenesis can be a very fickle thing. It tends to be very patchy in nature, and with the shale and siltstone interbeds I would not expect any great vertical communication.

Q. Geologically, do you see any necessity at this time to attempt to put the Hansen State well into a common pool with the Conoco well, which is well log 7?

A. No, I do not. I believe that they're producing from separate intervals.

Q. Any geologic indication in this immediate area

that you're dealing with an oil reservoir that has a gas cap to it?

A. No, it doesn't appear to be the case, and I would point to the experience we had with the Hansen State Number 3 where we tested that same stratigraphic interval that produces gas off to the east, and indeed it did produce oil.

Q. All right, the last comparison, Mr. Ott, if you'll make the distinction between the Conoco well -- it's Log 7 -- with Log 8.

A. Log 7, the Conoco Britt "B" Number 27 well, as I've already pointed out, was perforated in this upper Abo interval.

Log Number 8, which is the Texaco Kershaw Number 12 well, is also perforated in that same interval and was perforated in that same interval some twelve years prior to the Conoco well. And if you look up here at the cum's, it has cum'd almost entirely gas, about 168 million cubic feet of gas, very, very minor amounts of oil, with a high GOR of about 4.2 million. Yet, as you can see from the well-log correlations they're essentially in the same interval

Q. All right, sir. Summarize for the Examiner your recommendations, Mr. Ott.

A. I believe that as a prudent operator the Hansen State Number 7 well should be designated as its own pool,

it should be separate and distinct from the Skaggs-Abo Gas Pool.

I believe that in order to prevent waste, the pools so created should have a GOR allowable of 10,000 to 1, so that we can produce the oil along with the gas.

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

We move the introduction of his Exhibits 1, 2 and 3.

EXAMINER STOGNER: Exhibits 1, 2 and 3 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Ott, looking at the Number 7 well on your cross-section, that's that Conoco Britt "B" Well Number 27?

A. Yes.

Q. Looking at the cumulative GOR figures, it appears to me that that well could probably best be described as an oil well, as opposed to that Number 6. Is there some geological similarities between the Hansen 7 and the Britt 27 well?

A. That's correct, it did produce a fair amount of oil and could be classified as an oil well based on the GOR.

The only similarities that I see between the two

wells, the Hansen State 7 and the Britt "B" 27, are that they're in the Abo formation. They're essentially producing from different intervals.

Our primary production in the Hansen 7, based on the production log, is coming from this interval down here, which is the middle Abo. We're getting about one to two percent of our production out of this upper interval, which would correspond to that same interval in the Conoco well -- I'm sorry, this interval in the Conoco well. Based on that information, I have to believe that they're separate and distinct reservoirs.

But even though for some reason this Britt "B" 27 produced a fair amount of oil, it's coming from this horizon and not from down here somewhere.

The offset well that Conoco drilled, the Britt "B" 28, they perforated it in exactly the same interval, and it produced no oil. How that's explained, I really can't say at this point. I don't have a good explanation for that.

Q. Were you responsible for picking the perforations in the Hansen State "B" Number 7 -- I'm sorry, the Hansen State Number 7 well?

A. I was part of the team that picked those, yes.

Q. Okay. In looking at the similar- -- or in looking at the logs here between -- there again, between

the Britt "B" Number 27 and your Hansen State Number 7, would you have recommended testing that middle Morrow interval in that Britt "B" Number 27, or do you feel there's some potential there, or do you see any indications that there might be some activity in that middle Morrow -- I mean, I'm sorry, the middle Abo?

A. With the benefit of hindsight and modern technology, had I looked initially at the Conoco Britt "B" 27 when it was drilled, I might have recommended perf'ing the middle Abo. But I'm not privy to whatever data they had at the time when they picked their perforations, so I really couldn't say for sure.

Q. I'm having a hard time grasping what the geological separations between the -- I'll call it the 4 and 5, or the 4 5 wells and the 6 7 wells, other than Well 1 was perforated down in the middle and the others weren't. I'm still a little fuzzy on that, what actually the geological separation between that area is.

A. If you view the porosity within the reservoir as being secondary porosity -- in other words, it was not there initially, but it was created after these beds were deposited, and it was created primarily by fluids moving through the rock, dissolving out certain portions of the rock, such that the porosity goes from a low number of 6 to 8 percent, up to maybe 12 to 15 percent.

Wherever those fluids move through that rock system and dissolve out part of that rock to increase the porosity is where the reservoir was created. Now, we don't know what controlled the movement of those fluids through the rock. It may have been somewhat random. It's not consistent with any specific layer. It -- If you look at it in a map sense, it may be somewhat patchy with a patch of porosity here and a patch of porosity there and a patch somewhere else, which may or may not be connected up. They may be separate and distinct.

It tends to be something that is somewhat unpredictable. Geologists try very hard to predict where porosity is with carbonates, and frankly, we're still not all that good at predicting where that porosity is going to be. It can be somewhat fickle. It can be discontinuous, it can be patchy, it can be at times in a very small area, at other times in a very large area.

When you're dealing with thin-bedded rocks like we see here in the Abo, those porosity zones tend to be somewhat small in size, they don't tend to be well connected, they tend to be -- in a lateral sense, they don't tend to be well connected.

And with the interbedded shales and siltstones that we find in this backreef setting, they tend to be not very well connected vertically as well.

Q. Did you have these discussions with our geologist in the Hobbs office, Mr. Paul Kautz?

A. No, I did not.

Q. The secondary porosity that you referred to in that Hansen State 7 well, is that what the perforations and the productive intervals in the middle Morrow, when you move them back up into the Monument Abo Pool -- is that what's being seen there, is this secondary porosity?

A. Yes, I believe it is. We specifically targeted that secondary porosity when we picked these perforation intervals. The open-hole logs show a fairly uniform matrix porosity of 6 to 8 percent throughout the entire Abo interval. And just looking at the open-hole logs, you're at a loss as to where to pick perforations. It all looks basically the same.

However, when you look for that secondary porosity development, then you begin to see where there's some opportunity for reservoir development, and that seems to be the key out here, is that secondary porosity.

Q. There's about a two-mile gap between the Number 3 and the Number 4 well, but I do show that there are some penetrations or -- I'm assuming they're penetrations.

Did you use any information that was available to you, to determine the continuity of that secondary porosity of what you saw in the logs, or did you have any logs

available to you?

A. Secondary porosity is generally not seen on the open-hole logs.

Q. Okay.

A. It requires an FMI, formation micro-imaging tool, to see that secondary porosity. And I did not have those available for the intermediate penetrations.

Q. One last question. I always ask the geologist this, as opposed to the engineers. Do you have a proposed name for the pool?

A. No, I do not.

EXAMINER STOGNER: Do you have any other questions, Mr. Kellahin?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: Does anybody else have any other questions of Mr. Ott at this time?

You may be excused. Thank you, sir.

THE WITNESS: Thank you.

MIKE WISKOFSKE,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Wiskofske, would you please state your name and occupation?

A. My name is Mike Wiskofske, and I'm an engineer with Marathon Oil Company.

Q. On prior occasions have you testified before the Division?

A. Yes, I have.

Q. And you reside in Midland, Texas?

A. Yes.

Q. And you and Mr. Ott have been working on what to do with the Hansen State Number 7 well?

A. Correct.

Q. As part of your investigation have you studied the production characteristics of all the wells that he's shown on his cross-section?

A. Yes, I have.

Q. In addition, you've looked at others?

A. Correct.

Q. And you've examined the production characteristics of the Hansen State 7 well, as well as through your company had step rate tests conducted on that well?

A. Correct.

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

EXAMINER STOGNER: Mr. Wiskofske is so qualified.

Q. (By Mr. Kellahin) Summarize for us your major

conclusions as a reservoir engineer concerning this subject matter, Mr. Wiskofske.

A. Well, I have four conclusions.

One is that when that Hansen State Number 7 was drilled and completed, what we found was what we would consider virgin reservoir pressure, or if it wasn't virgin reservoir pressure it was very little pressure depletion in the well.

Two is that the majority of the production coming from the Hansen is different compared to -- coming from different perforations compared to the majority of the production of the Skaggs-Abo.

Three, that the Hansen 7 is producing a lot different than any other well in the Skaggs Abo Pool.

And four, that the Hansen State Number 7 is an oil well. It had a gravity of 40.3 degrees, and when the well -- I guess to date the well has already cum'd more oil than any well in the Skaggs Abo Pool but the Britt "B" Number 27, and that when the well is pinched back to a limiting GOR of 2000 to 1, the well makes all gas, no liquids, and therefore ultimate recovery will be substantially reduced due to no liquid being produced.

Q. Have you conducted tests on the well to determine what, in your opinion, is its most efficient rate of production?

A. Yes, we have, and we'll be presenting that in a later exhibit.

Q. Okay. In organizing your presentation, you have selected some wells to show the Examiner what their producing characteristics are in the various areas of the Abo. Let's start with the Skaggs-Abo Gas Pool. Let's look at your Exhibit Number 4, which is the Number 12 well on the cross-section. It's the Skaggs "B" Com Number 7 well.

If you'll turn your attention to that exhibit, identify first of all how you've organized the data. Tell us how to read this thing.

A. Okay. All this production data came from PI data. What I've got is a daily production plot with the red curve, the red series, being gas production daily. The magenta curve would be GOR, producing GOR, and the green curve as being oil production.

And really, the reason I picked this well was to show that this well was perforated throughout the entire Skaggs-Abo similar to perforations which we would have over on the Hansen 7.

And what I was showing with this was that this well from -- really from the first month it's been on, it has been a gas well. GOR has been over 100,000 to 1, and it's been relatively consistent.

Q. Okay, let's turn to Exhibit 5, which is Well

Number 7 on the cross-section. It's the Britt "B" Number 27. What's the significance of this production plot?

A. Okay, on this plot I added another column to it, or another series, and it's basically the 2000-to-1 GOR line. What I was trying to show with this is that this well initially came on as a gas well. For the first several months, I believe the first six months of the well, the well was classified, really, as a gas well, had a GOR greater than 100,000 to 1, was making very little fluids.

From, really, May of 1981 until July of 1994, this well was pretty much an oil well. GOR, as you can see, was -- looks like solution gas drive. GOR continued to climb as we go through the life of the well, and then in July, 1994, its GOR goes over 100,000 to 1, and it becomes a gas well.

Now, I guess --

Q. Let's see how this compares to the adjacent well, which is Number 6 on the cross-section. It's the Britt "B" 28. Let's look at that and then have you draw the distinctions between the Britt 27 and the 28.

A. Okay, the Britt "B" 28, as Val had mentioned earlier, it is completed in the same stratigraphically equivalent interval as the Britt "B" 27.

One of the important things to note is, on this well -- This well came on as a gas well from day one, 12 --

on February, 1990. However, if you look back on the Britt "B" 27, the Britt "B" 27 was still an oil well at this time. And if you look at the producing characteristics of it, by completing the Britt "B" 28 it did not seem to affect the production from the Britt "B" 27, it did not significantly increase the decline of that well.

Q. Let's pick up the third Conoco well in that section. It's the Britt "B" 9, which is not on the cross-section, and let's look at its producing characteristics in relationship to the 27 and the 28.

A. Okay. The Britt "B" Number 9, it was produced -- It was completed in December of 1981, and it was perforated from 7042 to 7055, which again is relatively the same stratigraphic section as the Britt "B" 28 and the Britt "B" 27.

The important thing on this well is, this well was completed directly offsetting the Britt "B" 27 in December of 1981, and on the production plot of the Britt "B" 27 -- and again, it -- The Britt "B" 9 came in as a gas well. But if you look back on the production plot of the Britt "B" 27, in December of 1981, again, no effect on the decline of the existing well, no effect on the decline of the gas rate on this well either. But yet the Britt "B" Number 9 came in as no oil.

Q. Let's go over to the Monument-Abo Pool now, and

pick up your Bertha Barber 16, which is well log 3, and describe for the Examiner the producing characteristics of that well.

A. Okay, this well was completed in really only the bottom section of the -- what we would call Zone 4, on our Hansen State Number 7. And on this well, it really has a low GOR. It's making about 130 barrels a day and about 200 MCF, but very little GOR. I think it comes out to be around -- just over 1000 -- probably about 1500.

Q. Let's now look to the Exhibit 9 which is your production data on the subject well. It's well log 4, and it's the Hansen State 7 well.

A. Okay. This again has the GOR curve in magenta -- or, I guess it's more pink. The gas rate is in red. The triangle green is daily oil rate, and then the blue with no marker would be water rate. And I added two lines on this, and one is -- one would be the 10,000-to-1 gas line, which would be the 1870 MCF. The other line is the 2000-to-1 gas line, and that would be 374 MCF.

The most important thing, I guess, on this production plot is, back earlier in the month we ran a seven-day buildup test on it, and then we produced the well at 2000-to-1 limiting GOR. And what we found on that is similar to when we ran a production log earlier in the life of the well. When we pinched the well back to 374 MCF, all

the liquids dropped out of the well, and we were making nothing but gas.

Q. When you restored the well to a rate that was not greater than a 10,000-to-1 GOR, what's the gas allowable at a 10,000-to-1 GOR?

A. At a 10,000-to-1 GOR, you'd be making 1.87 million gas per day.

Q. All right. And your oil allowable is still 187 barrels a day?

A. Correct.

Q. When you have that range of allowable, what happens to the well's ability to lift liquids?

A. Obviously, based on the current production history of this well, it looks that you almost need to -- You need to pretty much open the well up, to pull the well down to bring the liquids into the wellbore.

Q. Have you run tests on the well to see if you could determine what particular zone was making what level of contribution?

A. Yes, we have. Early in the life of the well we ran a production log on it, and that's Exhibit Number 10.

Q. All right, sir, let's look at Exhibit 10 and have you identify and describe what you're showing.

A. Okay. On -- I believe it was July 30th, 1997, we ran a production log on this well, and the production log

consisted of a pressure tool, a temperature tool, a spinner tool, a gradiometer tool, and a capacitance tool.

The spinner was calibrated with four runs, typically how most spinners are calibrated to make sure of accuracy. And we originally ran a production log at a flowing rate -- I believe they measured it at 322 barrels a day and 4.2 million MCF at the time.

What we found was that the majority of our production, approximately 47 percent of the oil and about 64 percent of the gas, was coming from the second interval. All right, which again, really the only wells that really -- Monument-Abo would have those perforations, and then more the Skaggs "B" 7 or the wells in more of Section 11 and 12 on the far east.

But what we did find were that the bottom interval, which would be our Zone 4, which correlates to Barber 16, which correlates more to Monument-Abo -- that interval, it made about 31 percent of the oil and very little gas, only about two percent of the gas, which kind of leads more to what the Barber 16 was producing at.

Very low GOR and -- you know, a decent enough oil rate. Obviously, it wasn't the majority of where the oil was coming from in the gas, because that was coming from Zone 2.

But another important thing that we saw from that

is that our upper interval, which was where we completed the Hansen 3 at -- you know, 20 barrels a day and 300 MCF, and the -- where the Britt "B" 27 is producing from, the Britt "B" 28 did produce from and the Britt "B" 9, that interval only made three percent of the gas and about a half a percent of the oil.

And on this chart, I guess, the red would be your bars of how much gas percentage, and then I've got the percentage right next to the end of it.

Q. Let's turn to Exhibit 11 and have you identify and describe that display.

A. Okay. The Hansen State 7, after we ran the production log on the well flowing, we felt if we needed to pinch the well back, at least closer to what the 2000-to-1 limiting GOR was. We actually only got it down to a 4000-to-1 on this test, and I believe -- We are flowing at an 830 MCF.

And what we found on this is that again, most of the gas was coming from Zone Number 2, not Zone Number 1, which, you know, originally going into it we felt that since those perforations were similar across, we thought most of our gas was probably going to come from Zone 1. It did not, it came from Zone Number 2. And then consequently everything else, pretty much minimal, six percent from the top, 93 percent from the bottom.

But what we didn't expect to happen was that the well, even at a 4000-to-1 limiting GOR -- or a 4000-to-1 producing GOR, we still were not able to make any liquids at that back pressure.

Q. When you look at the Conoco well that has producing characteristics of an oil well, it's the Britt "B" 27, isn't it?

A. Correct.

Q. The Britt "B" 27. Do you see any necessity at this point to -- Well, let me ask you this: If we left the Conoco Britt "B" 27 in the gas pool, even though it acts like an oil well, and create a new oil pool for the Hansen State 7, do you see any adverse consequences to Conoco if that's allowed to happen?

A. No. Really, in answer to the question, the Britt "B" 27, sure, it went through a phase where it was an oil well. But as of 1994, this well is strictly a gas well.

If these wells truly were in the same pool, it is my belief that when we completed the Hansen State Number 7, we should have saw some pressure depletion in that area, and we did not.

I mean, the Britt "B" 27 cum'd 5 BCF. And while it's still three-quarters of a mile away, there still should have been relatively a pressure drop in that area. Not substantially, but even with the Hansen 3 producing --

You know, we opened that, and we still did not see any pressure depletions in the Hansen State Number 7.

Q. Let's --

A. So I guess the answer to that question, no, I do not believe that leaving the Britt "B" 27 as a gas well in a separate pool would have any effect on the Hansen State Number 7.

Q. Let's look at the data on Exhibit 12 and have you explain to the Examiner your step rate data here for the subject well.

A. All right. What I did on this is, I have color-coded each different choke size that we have, magenta being at a 12. We opened it up to an 18, we opened it up to a 19 to try to get some idea on what we were looking at as far as an oil well. And each time we opened up the choke, the interesting thing was that the well behaved more and more as an oil well and less and less as a gas well.

Finally, though, we pinched the well back to a 15/64. One was because we started to make a little bit of water production and also because we needed to see what kind of gas ratio we would be looking at, at the allowable oil production rate of a 187-barrel-a-day.

So we produced that, the well pretty much stabilized between 130 and 150 barrels a day, and gas is running around between 1.6 and 1.8 million.

We then shut the well in for a pressure buildup and then brought the well back at a pinched-back rate of a GOR of 2000 to 1.

We then opened the well back up on 9-9-97, and again the well has pretty much leveled out around 80 barrels of water, 130 to 150 barrels of oil and about 1.6 to 1.8 million gas.

Q. Okay, let's look at the pressure buildup data, if you'll turn to Exhibit 13. Identify and describe this display.

A. Okay. I did not put the actual result from it. I'll let you -- We'll talk a little bit about that.

But what this exhibit is is basically delta T versus P. And as you can see, at the very beginning of the curve you have flowing bottomhole pressure right at the left end of about 2375 pounds, flowing bottomhole pressure. When we shut the well in, we build up to roughly about 2610 pounds. Our estimation of bottomhole pressure in this area, of what P* would be, is probably about 2800 pounds.

The results we saw from the well, what we felt we saw was a layered system, and -- a layered system with dual porosity, meaning we had a linear flow feature, which would be our vugular network, and then being fed by tight matrix rock.

Q. Have you tabulated for comparisons the cumulative

GOR of the various wells in the area?

A. Yes, I have.

Q. It's Exhibit 14, is it not?

A. Yes, it is.

Q. All right. Is there any observations you'd like to make to the Examiner concerning the comparison of the cumulative GORs of various wells?

A. Well, as our well, you know, is roughly at around a 10,000 GOR, the majority of the wells run between -- Well, all of them run between 38-, 39,000 and 4.2 million GOR.

The only well, of course, on the low end is the Britt "B" Number 9 -- or Britt "B" Number 27. And the way that well is producing, it's not going to be long before -- being it's making oil and gas, that well is going to continue to rise up the GOR limit.

But the only other well out there that has a GOR cumulative under 100,000 is the C.H. Weir Number 12. The rest of them all have over 100,000. And in some cases, like the Britt "B" Number 9, where it made -- It never made any liquid hydrocarbons; it was all gas.

Q. Having studied the data on the Hansen State 7 well, Mr. Wiskofske, have you satisfied yourself as a reservoir engineer that this well is, in fact, an oil well?

A. Yes, I am.

Q. Have you satisfied yourself that that well cannot be efficiently produced if it's required to maintain the 2000-to-1 GOR?

A. I believe it cannot be efficiently produced at a 2000-to-1 GOR.

Q. In order to effectively produce this well, what is your recommendation as to a GOR?

A. I believe with the stabilization of the well currently, I believe a 10,000-to-1 limiting GOR would -- should sufficiently allow us to produce the oil from this wellbore.

Q. As you've tested the well and produced it at these various rates, there's a column on your Exhibit 12 where you show total fluids in relation to gas. It's the third column over from the right.

A. Correct.

Q. It says GLR. That's gas versus total fluids, right?

A. Correct.

Q. All right. As you have tested this well, is there any indication that you're coning water at any of these various rates?

A. No. You know, we show, you know, water suddenly from one day all of a sudden at 120 barrels of water. We believe, really, that we were making water all along. And

we see some free water in there.

But what really happened about that time is, they started their chemical program out there, and we think that -- The way we're producing this well right now is, they don't have a surface commingling permit approved because they don't really know where they're going as far as pool called, and they're trying to get the oil commingled into the same battery with the existing production out there. So they're going into frac tanks.

And what we've -- they finally -- What we felt happened is, they went to -- They started injecting their chemical out there. What they had was a tight emulsion. And we felt that we've been making -- really been making water from the get go.

As far as an oil-water contact, we should be pretty far out in the ABO. I mean, lots of wells have produced from the bottom of the lower Abo, and we're pretty high based on that, being in the middle Abo, and we think we're far enough away from an oil-water contact where we're not coning water.

Q. Having satisfied yourself this is an oil well and that it needs to have rules similar to the Monument-Abo Pool, do you see any adverse consequence to having this well set up as an oil well in terms of its proximity to the Skaggs Gas Pool?

A. If I felt that the Skaggs -- having a gas well out there and that our well was in communication with that, I don't feel it's any detriment for our well on the Skaggs-Abo well. It's more -- It would be more the opposite, that the Skaggs-Abo well, being at the amount of gas it has produced through the life would be affecting our drainage radius to effectively produce our liquids.

However, we never saw any, really, pressure depletion from that well, from the amount of gas that is taken out. So no, I don't think so.

Q. All right. So you have examined the possibility that the Conoco Britt "B" 27 might be in communication with your oil well, and you've studied that and decided that, in fact, it's not?

A. No, I don't believe it is.

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

We move the introduction of his Exhibits 4 through 14.

EXAMINER STOGNER: Exhibits 4 through 14 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. What kind of water production is coming off that Britt lease that Conoco has?

A. None.

Q. None at all?

A. Not that I'm aware of. Off our production plots we don't show any.

Q. So you don't have an analysis or anything like that?

A. No.

Q. And your Hansen State Number 7 well came on production in the latter part of July; when I see that July 26th date, is that --

A. Yes.

Q. -- where it starts producing?

A. Yes.

Q. What size of choke is the preferential for that well?

A. It seems to be about a 15. It seems to be about 2300 pounds bottomhole pressure, seems to be most optimum, flowing bottomhole pressure.

EXAMINER STOGNER: Mr. Kellahin, I don't believe I have anything further at this time. Do you have anything further?

MR. KELLAHIN: Yes, sir, Mr. Examiner, I did not have a notary available to me, but I have my certificate of notice. The only offset operator within a mile is Conoco. We have contacted Conoco, they have no objection to this

Application.

Texaco has wells in Monument-Abo. They have leases in the area, but no production. We still notified them, and I received no objection from Texaco.

EXAMINER STOGNER: I do have one other question of this witness.

Q. (By Examiner Stogner) When this well was first permitted, it was permitted as a Skaggs -- I'm sorry -- Yeah, as a Skaggs-Abo gas well?

A. No, it was not.

Q. Why wasn't --

A. Oh, official -- What do you mean, when they first brought it on production?

Q. No, when it was -- Well, what was its primary zone of interest when it was drilled?

A. It was originally drilled as a Paddock oil well, and why it was drilled down to the Abo was, at the same time the Bertha Barber 16 had just come on line as they were drilling this well.

Q. What is the location of that Number 7 well?

A. The Hansen State Number 7?

Q. Yes.

A. It was 330 from the north line and 1650 from the east line.

Q. And when was the decision to go down to check the

Abo gas play?

A. It would have been very early in the life as we were drilling. I believe we were probably drilling about 3000 feet when they decided to take it down farther, as an exploitation tail.

Q. And this well has been producing since July?

A. Yes, we notified the OCD as soon as they had tested it.

Q. And so do you have a nonstandard gas well location application again, or approval?

MR. KELLAHIN: No, sir, I don't think we do.

Q. (By Examiner Stogner) That leads up to my next question. Why not?

A. Because the well came in as an oil well, and it --

Q. If it was within a mile of a gas pool, would that make it under the gas rules?

A. Yes, it would.

Q. So why did you do it and not notify anybody, especially your offsets?

A. I can't answer why we did not do that. I don't know.

Q. Who owns the property to the north in Section 9?

A. Texaco. I believe probably the reason why we did not notify them is, we thought we were in Monument-Abo. It

was our misunderstanding, until we delved into it farther, that we were going as Skaggs.

When we filed the permit as the Skaggs-Abo is when we noticed that it was a gas pool. Because even when we completed the Hansen State Number 3 back a year earlier, we did not know that was Skaggs-Abo. We thought it was Monument-Abo.

Q. Why shouldn't this well be shut in at this time pending this order, to make up for Marathon's mistakes?

A. As far as the eyes of the OCD, there is no reason why this well should not be shut in, other than lost revenue. But it was definitely not a deliberate, malicious intent on our part --

Q. It appears it was.

A. -- to do this.

Q. You're within a mile of a gas pool. In the middle of the drilling of the well, the Paddock oil well, you decided to go on down deeper into a gas interval.

A. Right --

Q. That's not malicious?

A. No, we felt --

Q. Are you telling me your regulatory people may not have known or something? I'm trying to find this out. This bothers me that this is happening very, very often, in fact, too often. Something needs to be done about it.

A. Well, I think as far as the mile rule, we did not know that we were going to go into the Skaggs-Abo, especially when we had --

Q. You didn't know you were right next door to it?

A. Well, we knew we were next door to the Skaggs.

Q. You knew you were within a mile of it?

A. We knew we were within a mile, but we did not know that that was just strictly a gas pool. It wasn't until we started doing the data-collecting for the hearing that we really, you know -- and asked -- when we brought the line one and said, Uh-oh, you know, Shoot, we're not in Monument-Abo like we thought. Because we would never have permitted after -- after testing the Hansen 3 -- it was an oil well -- we thought that well was in Monument-Abo.

Q. Is all of said Section 16 in this instance one lease, one common state lease?

A. Yes, just the -- What, the north quarter?

MR. KELLAHIN: It's the northeast quarter.

THE WITNESS: Northeast quarter.

EXAMINER STOGNER: So going from -- Well, actually what you're telling me, it never had a 160-acre dedication to it.

Marathon is to be commended for coming in and getting special rules. However, the location for these wells, going from gas to oil, one needs to be aware of

that, and I trust that I won't be seeing this again from Marathon in the future.

Mr. Kellahin, do you have anything further?

MR. KELLAHIN: Yes, sir, I'd like to have the opportunity to search with the permitting people of Marathon to see exactly what the sequence is concerning this well.

It's obvious that Mr. Wiskofske was not involved in that sequencing, and to satisfy you and to satisfy me, if you'll give me an opportunity, Mr. Lowry and I will provide you a written explanation of the chronology so that we can understand if some of our personnel were failing to abide by the rules.

There may have been contacts from the District that Mr. Wiskofske and I do not know about, and this is a matter of concern to me, and I'd like to address it and provide you with an explanation.

EXAMINER STOGNER: Bear in mind, we were going through a personnel change in our Hobbs District Office too.

MR. KELLAHIN: I recognize that, and I don't want to suggest to you there was something right or wrong about it. I just need to find out what happened.

EXAMINER STOGNER: Right, wrong or maybe different.

MR. KELLAHIN: Yes, sir.

EXAMINER STOGNER: That's your prerogative on that. I wasn't going to make it a requirement, but I will accept it.

Also, what I'd like for you to do is provide me a rough draft order.

MR. KELLAHIN: Yes, sir.

EXAMINER STOGNER: Bear in mind, limit it to about two or three paragraphs in the geological explanation for the finding, if you would.

Does anybody else have anything further?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: All right. So if nobody else has anything further in Case Number 11,853, then this matter will be taken under advisement.

(Thereupon, these proceedings were concluded at 9:30 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11853 heard by me on 18 Sept 1997.

, 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 September 20th, 1997.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998