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 RANGE OPERATING NEW MEXICO, INC., FOR AN ORDER INCREASING THE GAS-OIL RATIO FROM 5000 TO 10,000 CUBIC FEET OF GAS PER BARREL OF OIL PRODUCED FOR THE SOUTHWEST EUNICE-SAN ANDRES POOL LOCATED IN PORTIONS OF SECTIONS 4, 5, 6, 7, 8, 9, 15, 16, 17 AND 18 OF TOWNSHIP 22 SOUTH RANGE 37 EAST AND FOR ALL SAN ANDRES PRODUCTION WITHIN ONE MILE OF THE OUTER BOUNDARY OF THIS POOL, LEA COUNTY, NEW MEXICO	CASE NO. 13,820

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: RICHARD EZEANYIM, Hearing Examiner

November 30th, 2006

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, RICHARD EZEANYIM, Hearing Examiner, on Thursday, November 30th, 2006, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, 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

November 30th, 2006
Examiner Hearing
CASE NO. 13,820

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E X H I B I T S

Applicant's	Identified	Admitted
Exhibit 1	7	13
Exhibit 2	9	13
Exhibit 3	11	13
Exhibit 4	11	13
Exhibit 5	14	27
Exhibit 6	16	27
Exhibit 7	22	27
Exhibit 8	18	27
Exhibit 9	24	27
Exhibit 10	35	44
Exhibit 11	39	44
Exhibit 12	41	44

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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 8:23 a.m.:

EXAMINER EZEANYIM: Now I call Case Number 13,820. This is the Application of Range Operating New Mexico, Inc., for an order increasing the gas-oil ratio from 5000 to 10,000 cubic feet of gas per barrel of oil produced for the Southwest Eunice-San Andres Pool. This is in Lea County, New Mexico.

Call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing this morning on behalf of the Applicant, and with your permission we have three witnesses to be sworn.

EXAMINER EZEANYIM: Any other appearances?

May the witnesses stand up to be sworn, please?

(Thereupon, the witnesses were sworn.)

EXAMINER EZEANYIM: Mr. Kellahin, you may proceed.

MR. KELLAHIN: Thank you, Mr. Examiner.

Mr. Examiner, Range Operating is the majority operator in this San Andres Pool. They operate two-thirds of the wells. There's approximately 60 wells. They're seeking your approval to increase the gas-oil ratio from the current 5000 to 1 to 10,000 to 1 in the San Andres portion of this area. Above that formation in the

Grayburg, the Grayburg formation already enjoys a 10,000-to-1 gas-oil ratio.

And for reasons we're going to describe for you this morning, we believe it's not only equitable, but it's fair and appropriate and will prevent waste to make these the same for both pools.

And with your permission we will start with Mr. Bobby Ebeier. He's a landman with Range and will discuss the notice and the ownership, followed by Mr. Emery, Martin Emery, who is the geologist, will give you a geologic framework in which to see the engineering study that Russ Hensley is going to present to you, to show the justification for the request.

BOBBY EBEIER,

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. Ebeier, for the record, sir, would you please state your name and occupation?

A. Bobby Ebeier, I'm a senior landman with Range Operating, New Mexico, Inc.

Q. And where do you reside, sir?

A. Fort Worth, Texas.

Q. On prior occasions have you testified before the

New Mexico Oil Conservation Division?

A. Yes, sir.

Q. Have you had your qualifications as a landman accepted, and have you testified as an expert witness in prior cases?

A. Yes, sir.

Q. With regards to Range Operating New Mexico, does your company have an ownership and operating position in the Southwest Eunice-San Andres Pool?

A. Yes, sir.

Q. Are you familiar with the other operators in the pool?

A. Yes, sir.

Q. Have you researched for notice purposes to determine the offset operators of wells or interests in the San Andres formation?

A. Yes, sir.

MR. KELLAHIN: We tender Mr. Ebeier as an expert petroleum landman.

EXAMINER EZEANYIM: Mr. Ebeier is so qualified.

THE WITNESS: Thank you.

Q. (By Mr. Kellahin) Mr. Ebeier, would you turn to what we've marked as Range Exhibit Number 1, take a moment and unfold that display for us? Was this map prepared by you or under your direction?

A. Yes, sir.

Q. To the best of your knowledge, it is correct and accurate?

A. Yes, sir.

Q. When we look at this map, what is the purpose of the dashed red line on the display?

A. That was the area that -- of all of the operators that we noticed for this hearing.

Q. Within the red dashed line, there's an area shaded in green. What is that intended to represent?

A. That represents the area of the Southwest Eunice-San Andres Pool.

Q. Within the pool area that's outlined on your display there's an indication of wells.

A. Yes.

Q. Is there a color-code associated with the identification of the information on the display?

A. Yes.

Q. Have you examined the legend in the upper right corner of the display?

A. Yes.

Q. Is the information displayed on here, to the best of your knowledge, correct and accurate?

A. It is.

Q. When we're trying to find wells within the

boundary of the Southwest Eunice-San Andres Pool, how are they color-coded?

A. The wells that are in brown, that are shaded brown, are the San Andres wells.

Q. Do you have another map that will show the ownership position of Range within the pool?

A. Yes, that's another exhibit.

Q. Let's set this aside for a moment, the locator map.

A. Okay.

Q. If you'll turn to what is marked as Exhibit Number 2, would you identify for us what is marked as Exhibit Number 2?

A. Exhibit Number 2 sets out the leases that Range operates in the pool.

Q. In addition, does Exhibit Number 2 have other information besides the wells operated by Range?

A. It does. These leases are depth-severed, and what we will want to demonstrate in this exhibit are the rights that Range operates. For example, you'll see -- in Section 8 you'll see in red GB/SA. That's Grayburg-San Andres, those are our rights. And then if you go to the south half of Section 9 to the east, you'll just see SA. That means we just have the San Andres rights only.

Q. So when we're examining the relationship of the

Grayburg, which is above the San Andres, does Range have interest in both formations?

A. If it's set out on the map, we do.

Q. Will there be portions of the pooled area in which you only have rights in the San Andres?

A. That is correct.

Q. Does Exhibit Number 2 represent a list of all the operators and their wells within the boundaries of the San Andres Pool?

A. Yes, sir.

Q. Let's turn to Exhibit Number 3, Mr. Ebeier. Exhibit Number 3 is a one-page exhibit?

EXAMINER EZEANYIM: Mr. Kellahin, before you go further, let me ask this question.

Okay, I'm looking at Exhibit 1 where you have that red dotted line, and that's where you did your notifications, everybody was notified on that enclosure?

THE WITNESS: That is correct.

EXAMINER EZEANYIM: And did you get any objection? Were you able to find everybody?

THE WITNESS: We found everybody.

EXAMINER EZEANYIM: And there was no objection?

THE WITNESS: No objections, and they were probably notified. We sent them all of our notices certified mail, return receipt requested, and we got all of

our green-card notices back.

EXAMINER EZEANYIM: So everybody in this enclosure?

THE WITNESS: Yes, sir.

EXAMINER EZEANYIM: Okay.

Q. (By Mr. Kellahin) Returning now, Mr. Ebeier, to Exhibit Number 3, when we look at Exhibit Number 3 what is represented on Exhibit 3?

A. Exhibit Number 3 is all of the operators and their wells that operate within the pool.

Q. And for both tabulations of both lists, set forth in Exhibit 2 and 3, you have in fact, as you've just testified, notified all those parties?

A. Yes, sir.

Q. Let's turn to a notification. If you'll turn to Exhibit Number 4, let's talk about the notice. Did you undertake on behalf of your company the responsibility for notification of this Application?

A. Yes, sir.

Q. Is this your affidavit?

A. Yes, it is.

Q. Let's turn past the certification to the first page attached after that. It's a letter. What is this letter?

A. This letter is just a cover letter that sets out

the hearing and sets out -- well, attached to it would be the application for this hearing that was sent to each one of the operators.

Q. Did the application itself also have attachments associated with it, including the plat and the identification of the wells?

A. Yes, sir.

Q. As a result of the mailing, you sent it to what group of people? Is this a tabulation, then, of that group?

A. It is. Attached to it is the tabulation of all the operators, roughly 10 or 12 operators that we noticed.

Q. And following the tabulation is a copy of the green cards that you described a while ago?

A. Yes, sir.

Q. To the best of your knowledge, then, all the notifications are complete?

A. Yes, sir.

Q. Did you intentionally notify within each individual company the party that you knew had responsibilities for operations within the pool?

A. Where we felt like somebody was responsible, we sent it directly to them.

Q. And again did you have any objection from any of those operators?

A. No, sir.

MR. KELLAHIN: Mr. Examiner, that concludes my examination of Mr. Ebeier. We move the introduction of his Exhibits 1 through 4.

EXAMINER EZEANYIM: Any objections? At this point Exhibits 1 through 4 will be admitted into evidence.

You may be excused.

MR. KELLAHIN: At this time, Mr. Examiner, we call Mr. Martin Emery.

EXAMINER EZEANYIM: Mr. Martin Emery, you have been sworn.

Go ahead.

MARTIN EMERY,

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. Emery, for the record, sir, would you please state your name and occupation?

A. Martin Emery, I'm a geologist.

Q. Where do you reside, sir?

A. South Lake, Texas.

Q. And what is your current employment?

A. I'm employed by Range Resources.

Q. In what capacity, sir?

A. As a geologist.

Q. On prior occasions have you testified as an expert petroleum geologist before the Division in other cases?

A. Yes, I have.

Q. Is the geologic work we're about to look at your work?

A. Yes, it is.

Q. Were the displays we're about to look at prepared by you?

A. Yes, they were.

Q. Based upon that information and your prior knowledge, do you have opinions and recommendations concerning operations for this pool?

A. Yes.

Q. To orient the Examiner, Mr. Martin [*sic*], we're going to turn first of all to Exhibit Number 5. It's the small one.

EXAMINER EZEANYIM: At this point I might interject and say that Mr. Emery is so qualified --

MR. KELLAHIN: Thank you.

EXAMINER EZEANYIM: -- to give his presentation today.

Q. (By Mr. Kellahin) As part of your study, Mr. Emery, when we look at Exhibit 5, does the area shaded in

blue represent the area that's part of the study area for your work?

A. Yes, it does. The areas shaded in blue are Range's leaseholds in the Southwest Eunice-San Andres Pool area.

Q. How long have you been responsible for the geology for your company in this area?

A. About a year and a half.

Q. Is this a recent acquisition for your company?

A. Yes, we acquired this property -- these properties, about a year and a half ago.

Q. As part of that acquisition, did you acquire the rights to certain portions of the pool for the San Andres?

A. That is correct.

Q. In addition, within the pool area did you also acquire the operating rights for the San Andres?

A. Yes.

Q. Are you familiar with the geology for both formations?

A. The Grayburg and San Andres, yes.

Q. Let's turn to Exhibit Number 6, Mr. Emery.

For your information, Mr. Examiner, Exhibit 6 is just a tabulation that Mr. Emery and I have provided for you as a reference.

EXAMINER EZEANYIM: Please excuse me, I'm still

looking at Exhibit 5. Let me ask the questions as you go ahead. You have those red lines connecting those wells. What does that mean?

THE WITNESS: Those are lines of cross-section which are subsequent exhibits. We'll look at those in a minute.

EXAMINER EZEANYIM: Okay --

THE WITNESS: So we'll refer back to this map for those lines of cross-section.

EXAMINER EZEANYIM: Okay.

Q. (By Mr. Kellahin) Turning now, Mr. Emery, to Exhibit Number 6, included in this package is there a copy of the order by the Division that established the current gas-oil ratio for the San Andres of 5000 to 1?

A. Yes, there is.

EXAMINER EZEANYIM: Is this Exhibit 6?

MR. KELLAHIN: Yes, sir.

EXAMINER EZEANYIM: It's not marked.

MR. KELLAHIN: I'm sorry, I have 6 --

EXAMINER EZEANYIM: It's not marked, I don't know.

MR. BROOKS: My copy is marked.

EXAMINER EZEANYIM: Oh, okay.

MR. BROOKS: Do you want to give me yours?

EXAMINER EZEANYIM: Okay, go ahead.

Q. (By Mr. Kellahin) Have you examined that order, Mr. Emery?

A. Yes, I have.

Q. Is there any indication in the language of the order as to why the Examiner, Mr. Nutter at that time, back in 1980, did not grant Zia's request for 10,000-to-1 gas-oil ratio?

A. I could not find the reason why the 10,000-to-1 gas-oil ratio was not granted.

Q. Do you find any other orders associated with the rules for the pool, other than the Zia order?

A. No.

Q. So we can set the geologic stage for the Examiner, would you turn to what is marked as Exhibit Number 8? Let's take a moment and unfold that cross-section.

A. We've skipped ahead one exhibit.

EXAMINER EZEANYIM: What did you say?

THE WITNESS: This is Exhibit 8.

EXAMINER EZEANYIM: Oh, this one?

THE WITNESS: No, that's Exhibit 7.

MR. KELLAHIN: We've skipped ahead to Exhibit 8, I'm sorry.

EXAMINER EZEANYIM: Oh, okay. This one?

THE WITNESS: Yes.

EXAMINER EZEANYIM: Go ahead.

Q. (By Mr. Kellahin) Let's start with Exhibit Number 8, Mr. Emery, and my objective is to have you take Exhibit 8, refer back to Exhibit 5, which has got the line of cross-section on it.

A. Exhibit 8 is the northernmost cross-section on Exhibit 5.

EXAMINER EZEANYIM: Okay.

THE WITNESS: So it goes through these four wells in Section -- the southern part of Section 9.

EXAMINER EZEANYIM: Okay.

Q. (By Mr. Kellahin) I want you to set the geologic framework of the San Andres and the Grayburg, and once we have that visualization in this plane, we'll look at the horizontal plane and see what the structure looks like.

A. Okay.

Q. So let's start now with Exhibit Number 8 and have you first look at the Grayburg. How do you as a geologist find the upper and lower limits of the Grayburg?

A. On this cross-section, the top of the Grayburg is depicted in Gray and is marked Grayburg. The base of the Grayburg is at the top of the San Andres, which is the brown -- the heavier brown line in the middle part of the cross-section. And those correlations are based mainly on the gamma-ray response.

Q. When we look at the Grayburg itself, describe for us the character of the reservoir. What are we dealing with?

A. The Grayburg is -- it's a dolomite hydrocarbon reservoir, generally variable porosity and permeability, both being relatively low.

Q. What type of drive mechanism is associated with the Grayburg?

A. We believe the drive mechanism in the Grayburg is solution gas drive.

EXAMINER EZEANYIM: What?

THE WITNESS: Solution gas drive.

Q. (By Mr. Kellahin) At this point in the life of the reservoir, has it been substantially depleted?

A. Yes, the Grayburg reservoir has -- the initial development of that reservoir in this area began in the 1940s.

Q. Describe for us how that development took place in the Grayburg.

A. The early wells in the Grayburg Pool were drilled with cable tools, and typically those wells would encounter gas in the Penrose-Skelly, which is marked in yellow -- that's the top of the Penrose-Skelly -- and the operators would set casing across the gas zones of the Penrose-Skelly and then drill open hole and complete open hole in the

Grayburg oil zone below.

Q. Was there any water production associated with producing the hydrocarbons out of the Grayburg?

A. Yes.

Q. What historically has been done with the water produced out of the Grayburg?

A. There was, I think in the 1950s -- the water was reinjected, and in the 1950s they formed the Penrose-Skelly-Grayburg Unit. The unit has been dissolved, so it's no longer active. So some of the produced water was used for reinjection for flooding purposes, some of the other water was reinjected -- or was injected into the underlying San Andres for disposal.

Q. When we look at the base of the Grayburg, what is the marker or geological event that separates the Grayburg from the upper San Andres?

A. It's a relatively thin shale, you can see on the gamma ray. For example, in the Greenwood Number 22 well -- it's the second well from the right on the cross-section -- there's a six-foot or so shaly interval right at the top of the San Andres. So that's the distinction between the San Andres and the overlying Grayburg.

Also, the San Andres displays better porosity than the Grayburg, typically.

Q. When you move down into the San Andres, how then

do you describe or identify as a geologist the top and the bottom of the San Andres?

A. The top is picked as I've just described, mainly off the gamma-ray, the base of that thin shale. The base of the San Andres a lot of these wells do not penetrate. It's at about 5100 feet, at the top of the Glorieta formation.

Q. What kind of reservoir is the San Andres?

A. The San Andres is also a dolomite reservoir. And like I said previously, it displays better porosity than the overlying Grayburg.

Q. Is the shale, the thin shale barrier, marker, between the San Andres and the Grayburg, still intact?

A. I think it's been compromised by some of the completions in both the Grayburg and San Andres. Typically these reservoirs require stimulation to produce at commercial rates. And you can see on the wells depicted on this cross-section and the subsequent cross-section where the zones have been perforated. Those would be the red indicators in the depth track of the wells. And during stimulation that thin shale has probably been compromised.

EXAMINER EZEANYIM: What type of stimulation do you use? Frac'ing? What -- what type of stimulation do you use?

THE WITNESS: Either large acid jobs or frac'ing,

combination of both.

Q. (By Mr. Kellahin) Do you have an indication as a geologist, the extent of the upper and downward migration of the fractured treatments in the San Andres? I'm sorry, in the Grayburg?

A. We do not know exactly, but we have an estimation based on the size of the frac jobs that are typically applied to the Grayburg today, that we're probably growing 150 or 200 feet up and down from the perforated interval.

Q. As a result of historic completion practices, are you satisfied as a geologist that the San Andres and the Grayburg are now in communication with each other?

A. Yes.

Q. Is there a gas cap associated with the Grayburg?

A. There doesn't seem to be. There was, as I stated previously, gas reserves in the Penrose-Skelly, but within the Grayburg-San Andres system there wasn't an initial or secondary gas cap.

Q. Is there a gas cap associated with the San Andres?

A. No.

Q. Let's go back to the structure map. If you'll turn back to Exhibit Number 7, let's put this in context. What is the marker you've used for Exhibit 7 to construct your structure map?

A. This is a structural contour map contoured on top of the San Andres, so on the cross-section that would be at the brown level.

Q. What's the significance of the color code on Exhibit Number 7?

A. The contour interval is 10 feet, and the red color-filled contours, or the redder color-filled contours, are structurally higher than the yellow. And then the deepest or the lowest structural levels are shaded green.

Q. When you compare the structural area displayed on Exhibit Number 7 to the magnitude of structural change as displayed on Exhibit Number 8, which is your structural cross-section, what is that range of change of elevation?

A. Oh, it's probably on the order of 25, 30 feet.

Q. Is that enough structural change through the extent of the reservoir to make a difference in terms of where the hydrocarbons are accumulated?

A. No.

Q. So structure is not an influence on how the rules ought to be adapted for the pool?

A. No. And I think from the structure map -- superimposed on the structure map is the outline of the Eunice -- or Southwest Eunice-San Andres Pool, and it's apparent that the pool outline does not conform to structure.

Q. In terms of development of the San Andres, do you find as a geologist further opportunities for increased density wells within the pool?

A. Yes, we do.

Q. And what accounts for that?

A. It's the reservoir heterogeneity in both the San Andres and the Grayburg, there's a lot of compartmentalization in these carbonate reservoirs, and that's evidenced by fluid distribution, pressure distribution where we have some data.

Q. Do you as a geologist see any adverse consequences to having the Division increase the gas-oil ratio in the San Andres to 10,000 to 1?

A. No, I do not.

Q. Let's turn now to the cross-section that's farther south from Exhibit Number 8 and have you direct your attention to Exhibit Number 9.

EXAMINER EZEANYIM: Is this 9?

THE WITNESS: Correct, it's a long one.

EXAMINER EZEANYIM: Is that for the lower portion over --

THE WITNESS: Right.

EXAMINER EZEANYIM: Go ahead.

Q. (By Mr. Kellahin) Again, then, you can relate Exhibit Number 9 back to Exhibit Number 5 for the line of

cross-section?

A. Yes, on Exhibit Number 5 this is a longer cross-section from west to east.

Q. What are your conclusions about Exhibit Number 9?

A. Again, this is a structural cross-section. The conclusions are that structure is not a key component for the distribution of fluids within both the Grayburg and San Andres reservoirs, it's not a key part of the trapping, it's more stratigraphic.

And other key conclusions are that, you know, both the Grayburg and San Andres are dolomite reservoirs that show varying porosity and permeability, and as such there is a fair amount of compartmentalization in both of the reservoirs.

Q. When we look back at Exhibit 5, can you give the Examiner an indication from Exhibit 5 as to where in this area you have a divided responsibility between areas where you own just the San Andres and other areas?

A. Exhibit 5 is this map, and in the lower part of these blue areas, you'll see in red SA or GB/SA. Where we have only the San Andres rights, it will be labeled SA. So Range has only the San Andres rights on those --

EXAMINER EZEANYIM: SA?

THE WITNESS: Yes. Where we have both the Grayburg and San Andres it's labeled GB/SA.

Q. (By Mr. Kellahin) So for example, in the south half of 9?

A. In the south half of Section 9, we have only the San Andres rights.

Q. Are there wells in the Grayburg within the south half of 9?

A. Yes, there are.

Q. And they would be managed by a different operator?

A. That's correct.

Q. In the north half of 16, then, you have the opportunity to develop both the San Andres and the Grayburg as the common operator for those two pools?

A. That is correct.

Q. As a result of that relationship, have you and the engineer that works with you determined that there is an inequity to the owners of the San Andres portion of the area?

A. Yes, we believe so.

Q. Is that inequity attributed to the fact that you can't produce the San Andres at a gas-oil ratio of 10,000 to 1?

A. That's correct.

Q. Would it equalize that operating practice so the interest ownership can enjoy the same advantages as the

Grayburg if both pools are on the same gas-oil ratio?

A. Yes.

Q. As a geologist, have you seen any perceived waste issue occurring by that rule change?

A. No.

Q. Are you aware of any correlative rights that might be impaired if that rule change is effected?

A. No.

MR. KELLAHIN: That concludes my examination of Mr. Emery. We move the introduction of his Exhibits 5 through 9.

EXAMINER EZEANYIM: Exhibits 5 through 9 will be admitted into evidence.

EXAMINER EZEANYIM: So help me here. Are you going to demonstrate when the engineer comes of how the inequity exists --

MR. KELLAHIN: Yes.

EXAMINER EZEANYIM: I'm talking about inequity.

MR. KELLAHIN: Yes.

EXAMINER EZEANYIM: I need to see how you calculate your inequity --

MR. KELLAHIN: We're going to show you.

EXAMINER EZEANYIM: -- between the SA and the Grayburg.

MR. KELLAHIN: Yes.

EXAMINER EZEANYIM: Okay. You may be excused.

RUSS HENSLEY,

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. Hensley, for the record, sir, would you please state your name and occupation?

A. Russ Hensley. I'm a consulting petroleum engineer for Range Resources.

EXAMINER EZEANYIM: Can you repeat that please? Russ -- ?

THE WITNESS: I'm a consulting reservoir petroleum engineer.

EXAMINER EZEANYIM: I mean your name.

THE WITNESS: Russ, R-u-s-s, Hensley.

Q. (By Mr. Kellahin) Mr. Hensley, on prior occasions have you testified before the New Mexico Oil Conservation Division?

A. I have not.

Q. Summarize for us your education.

A. I'm a petroleum -- bachelor of science, mechanical engineering, from Texas Tech in 1968. I went directly to work for Amoco in 1968 as a petroleum engineer, worked for that company in various capacities, mainly in

west Texas, waterfloods, carbonates, for a little over 10 years. Then I worked with Texas Pacific Oil Company out of Midland, Texas, where they have a number of waterfloods and a number of properties in southeast New Mexico.

From that -- After the sale of Texas Pacific Oil Company to Sun, I worked for various independent oil companies in the Dallas-Forth Worth area. Eventually they were either traded, sold, or whatnot, and I wound up becoming a consultant about 10 years ago. I've been consulting with Range as one of my clients since 1998 and consult for various other companies in the metroplex.

Q. As part of your engineering responsibilities to Range, have you studied the engineering and performance information available for the San Andres and Grayburg wells within the area of interest?

A. Yes, about a year ago, as Range undertook their development, I was engaged to work with the geologist and the drilling department as they developed this particular area they had acquired from Plantation in mid-2005.

Q. As a result of that experience and work, do you now have opinions and recommendations to the Examiner concerning the gas-oil ratio for the San Andres portion of this area?

A. Yes, I do.

Q. Do you have engineering displays that you have

prepared to present, to explain your reasons for that opinion?

A. Yes, I do.

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

EXAMINER EZEANYIM: Mr. Hensley is so qualified.

Q. (By Mr. Kellahin) Mr. Hensley, to orient the Examiner as to the wells that you're going to describe in some detail, let's take a moment and refer you back to Exhibit Number 5, which is our locator index. On exhibit 5 we're going to describe in a moment the performance and your opinions about three wells?

A. That's correct.

Q. Let's take a moment on Exhibit Number 5 and find each of those three wells.

A. The three wells I'm going to discuss on the southern cross-section would be -- the second well from the right would be Cole State --

EXAMINER EZEANYIM: What section? What section?

THE WITNESS: Would be the southernmost section --

MR. KELLAHIN: 16.

THE WITNESS: -- in Section 16, the north half of Section 16. It would be the Cole State 19 well and the Cole State 17 well. They're side by side on an east-west

orientation.

Q. (By Mr. Kellahin) So you're looking at Section 16, you're starting in the northeast quarter, and in the northeast quarter you're looking at the southwest quarter, and you pick up Well 19?

A. Yes, sir.

Q. And then you move over into the northwest quarter and look at the southeast of the northwest --

A. Right.

Q. -- and you find 17?

A. That's correct.

Q. Now how do I find the third well?

A. The third well, which is the Greenwood 22, is located in Section 9, the very southeast corner. It would be the second well from the right, and on that locator line for the cross-section.

Q. So again in Section 9, you're in the southwest of the northeast?

A. Correct -- No, that would be the southeast of the --

Q. The southwest of the northeast?

A. Correct.

MR. BROOKS: Southwest of the southeast.

THE WITNESS: Yeah.

Q. (By Mr. Kellahin) Southwest of the southeast.

A. Southeast, that's what I'm --

Q. Okay, we're all on the same wells?

A. Right.

Q. Okay. At this point let's talk about the ultimate conclusions that you have reached as part of your study, and then we'll go back and show the Examiner how you got to your conclusions.

Let's start with the nature of the maturity of these reservoirs.

A. Both the Grayburg and San Andres are very mature in their depletion stages. As Mr. Emery testified, the development of these reservoirs has been going on since the late 1930s or early 1940s, with most attention given to the Grayburg initially because it was shallower. So it is probably a little bit more depleted by virtue of the fact that it was drilled first.

The San Andres over the last number of -- oh, I'd say two decades, has been developed as well.

Both reservoirs exhibit solution gas drive performance in that you start out at a relatively high rate and you see gas evolve, you know, gas-oil ratio.

But one of the things that's interesting about these two reservoirs is that they're in a complex container, as Mr. Emery testified, where you have various lenses or compartments that seem to have produced more

quickly than others.

Another thing that's happened to both reservoirs, they've seen the introduction of water injection in the form of disposal and intentional waterflood where in the -- particularly in the lower part of the San Andres, we see quite a bit of water when we run -- we complete some of the new wells, which I'll show later.

So we have distribution of fluids throughout this column, and we have lower pressures that you would expect from another type of drive mechanism, say, for example, partial water influx.

Q. Are you experiencing water cuts in the San Andres such that it makes it feasible to use high-capacity submersible pumps to lift the fluids?

A. Definitely. Every well that Range operates -- excuse me, all the new wells we have to rod-pump, and as I recall, we have 17 wells that produce using electric submersible pumps, because we have such high fluid levels. We have to do this in order to remove the column to permit oil and gas to flow from the reservoir. We have low pressures.

And when we do that, by its very nature we're responding to the fact that the reservoirs are probably being partially waterflooded. And one of the cardinal rules is, you keep all your wells pumped off, you'll

produce the most hydrocarbons.

Q. As a result of completion practices historically, are the San Andres and the Grayburg now functioning as if they were one reservoir?

A. Yes. There's a couple of reasons for that. Several of the operators that are in the field, they complete, as we do too, in both Grayburg and San Andres formations. So the reservoirs are compromised by virtue of commingling.

In addition to that, completion practices are such that both reservoirs require stimulation. And in fact, large acid jobs and large-volume frac jobs, both in the Grayburg and San Andres, by its very nature, would cause the reservoirs to communicate from those stimulations.

So overall, the two reservoirs are in communication and produce as a unit as a result of these activities.

Q. In your opinion, should the Examiner approve an increase in gas-oil ratio for the San Andres to 10,000 to 1?

A. Yes.

Q. Would that rule change provide the opportunity for Range and other operators to increase ultimate recovery out of the San Andres Pool?

A. Yes, it would, particularly in the San Andres where we only have San Andres rights. As I mentioned, we have to pump all the wells, so it's difficult to manage a well when it approaches the gas-oil ratio limit in a particular lease. So as a result, on a correlative basis, those leaseholders in the leases where we only have the rights are actually being curtailed, whereas a party that has both Grayburg and San Andres rights doesn't really face that problem.

Q. Let's illustrate those conclusions for the Examiner. If you'll start, sir, with Exhibit Number 10, let's take a moment, relate 10 back to Exhibit 5 so we can again find where Well 19 is.

A. This is a graph of production tests, Exhibit 10 is, of Cole State 19's individual well test, and it is again the second well from the right on the southernmost cross-section, and it is Section 16.

Q. Well 19 is going to be an example of a Grayburg-San Andres well?

A. Yes, that's correct, and it's also presented on the cross-section, which is Exhibit 9, being the second well from the right on that exhibit. The red perforations are indicated in the depth track column, and it shows on that depth column we have perforations both in the Grayburg and San Andres.

Now on the graph itself, when this well was initially completed it was tested only in the lower part of the San Andres, which is a long string of red perforations shown from about 4000 feet down to about 4200 feet. Those perforations produced only water. And as a result, Range chose to set a cast-iron bridge plug, which is indicated in gray in the column, to abandon and isolate those, and then added the new perforations above.

But before that was done, and in the process of testing, a pressure was measured in the San Andres, and that's indicated on the graph in the upper right-hand area. On November 18th, the bottomhole pressure was 1399 p.s.i. at a depth of 4120 feet. And at that time the tools indicated that the fluid level was standing at 2169 feet above pump, or above the test point.

Now as far as the production of the well, after the cast-iron bridge plug was set over the lower San Andres, then the Grayburg and the San Andres was open, and it was acidized and frac'd. So both reservoirs experienced a similar stimulation.

We can see on the graph in green and red dots, in barrels of oil per day and MCF per day, the producing rates on the logarithmic scale. In January we were producing from this well about 60 barrels a day. There was some variation test -- testing facilities with water in the 300

to 500 barrels of water a day, sometimes your separation in cold months is difficult. We were making about 350 barrels of water a day. This was -- this well was being produced using a rod pump.

You'll note there's also a brown line. It shows the fluid level above pump. So we had a well that had to be rod-pumped in order to produce and to keep the fluid off the formation in order to produce 65 to 70 barrels of oil a day and up to 300 MCF a day.

Q. If you're producing the Grayburg and the San Andres together in this well, give us an example of the range of oil recovery available when that combination is exercised. What's your daily rate on average?

A. Daily rate on average is now settled into being about 15 to 20 barrels a day, along with 300 MCF of gas a day. Along with that, we're having to produce anywhere from 100 to 80 barrels of water a day, on average.

Q. If the gas-oil-ratio is increased in the San Andres, are you depleting the drive mechanism for the remaining oil production?

A. No.

Q. So the production of additional oil at this point is unrelated to the gas-oil ratio?

A. It really is. In fact, the pressures have essentially settled in, as we'll show in some of these

other graphs, that they're really communicated.

And the most important consideration is the removal of the liquid, so the gas-liquid ratio becomes more important so that we can efficiently produce both oil and gas out of the wellbore.

Q. If you don't remove greater volumes of liquids from the wellbore, what's going to happen to the remaining oil production in the San Andres?

A. It will be reduced, just like in any waterflood. If you don't remove the fluid column, well then your oil and gas would be curtailed or non-existent.

Q. Is there a competitive advantage for those wells that are allowed to be operated in such a way that they can produce the San Andres and the Grayburg together commingled?

A. There is.

Q. Is there a corresponding disadvantage to those owners that have only the San Andres being produced?

A. Yes.

Q. Is the example on Well 19 typical for the performance of a well that's in the Grayburg-San Andres?

A. Yes.

Q. Let's turn now to two examples of what happens when you have --

EXAMINER EZEANYIM: Before you leave that Exhibit

Number 10 --

THE WITNESS: Yes.

EXAMINER EZEANYIM: -- all this -- the oil production, is this after your stimulation job on this exhibit here?

THE WITNESS: Yes.

EXAMINER EZEANYIM: I can see your oil production is in green; is that right?

THE WITNESS: That's correct, green.

EXAMINER EZEANYIM: And is this after the stimulation process?

THE WITNESS: It's after the stimulation, yes, sir. In fact, on Well Number 19 we didn't really see but a skim of oil, barely noticeable until we isolated that lower part and moved on uphole.

EXAMINER EZEANYIM: Okay.

Q. (By Mr. Kellahin) Let's turn now, Mr. Hensley, to Exhibit 11 and have you describe for us the Cole State 17 well.

A. The Cole State 17 well is immediately to the west of the Cole State 19 on the cross-section and map, and this particular well was completed in the San Andres only, and it was initially frac'd and the bottomhole pressure measured in the San Andres.

On the cross-section the perforations are

indicated in red, on the cross-section, just below the San Andres brown line.

Now this well came in after the frac and the bottomhole pressure again was measured, 343 p.s.i. at 3905 feet, mid-perf. The fluid level was 3700 feet.

The well was put on rod pump, and initially we had to pump quite a bit to get enough water off that gas started to appear by the end of December, 2005.

It's not shown on this graph, but this well was making about 2 or 3 and then got up to about 5 barrels a day. It's off the end of -- off the bottom of the graph and didn't show up. But gas then rose to about 225 MCF a day.

As you can see on the time scale as we move further to the right in time, around April, 2006, we were making as much as 380 MCF a day. In fact, we tested a little over 400 MCF a day on a couple of days. Those are in red dots scattered on out as they were actually tested. We're not able to test the well every day, but we have test facilities where we can get tests, and these are the recordings of those tests. So this particular was capable of top allowable of 400 MCF a day by mid-June, 2006.

Q. And that's using the restricted gas-oil ratio of --

A. Yes, sir.

Q. -- 5000 to 1 for the San Andres?

A. Yes, sir.

Q. When you have a top gas allowable for that reservoir, what's your corresponding daily oil rate?

A. 80 barrels a day. This well was not making 80 barrels a day, it was making 2 to 5 barrels of oil a day --

Q. Okay.

A. -- as skim.

Q. If the rule is changed, do you have an engineering opinion as to what will happen to the corresponding oil rate?

A. In this particular well, it's pretty much max'd out. It wouldn't be much of a change at all. But there are other wells that have shown capabilities, because we've encountered zones where the pressure has been a little bit higher, say like 500 pounds, so we could exceed that allowable quite easily from a gas-oil-ratio-limit standpoint.

Q. So if we equalize the gas-oil ratio for both reservoirs at 10,000 to 1, while this is not an example, you'll have other San Andres wells that will correspondingly increase their ultimate recoveries?

A. Yes.

Q. Let's turn now to the last example, Exhibit Number 12, and look at the Greenwood 22 well.

A. Greenwood 22 is located in Section 9, the very southeast corner of Section 9, and this well was drilled in August of 2005, and this well was completed only in the upper San Andres. And at the time of its initial completion in August of 2005, we measured the bottomhole pressure at 580 p.s.i. at 3938 feet.

After this well was frac'd and we recovered the load water from the frac, you can see that the well was put on rod pump in this case. Water volumes were anywhere from 300 barrels of water per day to as little as -- there was probably a pump problem, 20 barrels a day, but it settled down to roughly 200 barrels of water a day. But we have gas rates that approach 400 MCF a day, particularly in the initial stages of completion, so this well was capable of exceeding the allowable for the San Andres at that point.

Q. What was the corresponding oil rate when you were at top allowable, using the restricted 5000-to-1 GOR?

A. This well was making about, again, 5 -- 2 barrels of oil -- 5 to 2 barrels of oil per day. It was really an oil skim mixed with the water.

Q. In your opinion, what will happen to the performance of the well if we increase the gas-oil ratio to 10,000 to 1?

A. Well, the well will perform essentially the same. If we were allowed to pump it a little bit harder we might

get a little more gas and oil out of it, but what is happening to the San Andres is, it's very evident that the saltwater disposal has been -- has partially flooded this area. So that oil, and of course the accompanying gas, would be produced if we could produce it at its max level. It's better to keep your wells pumped off.

EXAMINER EZEANYIM: How much are you going to get when you increase it to 10,000 to 1? Do you know?

THE WITNESS: Well, my estimate is that we would pick up another, oh, 2 to 10 barrels of oil per day, and we might pick up some additional gas if we can keep the well completely pumped off. And we've been able to do that with some submersible pumps where we had both the Grayburg and San Andres rights together.

Q. (By Mr. Kellahin) As you -- as these wells are produced, there is some association with a slow migration of a waterfront from the waterflood through the San Andres?

A. Well, the saltwater disposal, as we've demonstrated, is actually flooded out, some of the interval. It's been going on for decades.

And in addition to that, to the west XTO is still operating the Arrowhead Grayburg Unit where they're injecting water, so there's a distribution of fluids throughout Grayburg and San Andres. They're in essence acting as a unit in that regard.

Q. Would it be fair to characterize this as a salvage operation for the remaining oil in the San Andres?

A. In my estimation, this will be about the last effort to recover the maximum amount of hydrocarbons from these two intervals that are largely depleted.

Q. Will this improve the opportunity to recover additional hydrocarbons if the gas-oil ratios for both pools are at 10,000 to 1?

A. Yes.

Q. Do you see any adverse consequences to recoveries if that occurs?

A. No.

Q. Do you see any disadvantage to correlative rights if that's allowed to happen?

A. No.

MR. KELLAHIN: That concludes my examination of Mr. Hensley. We move the introduction of his exhibits 10, 11, and 12.

EXAMINER EZEANYIM: Hensley's 10, 11 and 12 will be admitted into evidence.

EXAMINATION

BY EXAMINER EZEANYIM:

Q. I wanted you to explain to me the inequity. You know, the inequity was mentioned. I know -- I understand what you are -- justification, but I want you to tell me

how the inequity exists between San Andres and Grayburg. Somebody already -- geologist mentioned it, and I expected you to explain it to me, how that inequity exists.

A. Okay, sure. Exhibit 5, where we have marked where Range has Grayburg and San Andres rights in some leases --

Q. Uh-huh.

A. -- and in other leases it only has the San Andres rights, and that's all that's required in this acquisition.

Q. Yeah.

A. As an example I'll use Sections 9 and 16, which are the larger blue areas on that map.

Q. Okay.

A. If in the Greenwood lease you get a well that is capable of producing more than 400 MCF of gas a day, then that lease has an allowable of 80 barrels of oil times a GOR of 5000 to 1, and that gives you that your gas would be, in this case, 400 MCF a day.

Now in the -- if you have Grayburg rights and you have San Andres rights, Grayburg is allowed to produce a gas-oil-ratio limit of 10,000. It has 80 barrels a day times 10,000, so that's 800 MCF a day.

In other words, if you have a well in Greenwood that can produce 600 MCF a day, you've exceeded the rights that you're allowed under the gas-oil-ratio limit of 400

MCF a day, whereas immediately offsetting this lease in the Grayburg, we've already demonstrated, I think, that these reservoirs are in communication, relatively speaking, the interest holders in the Cole State can produce that well legally.

EXAMINER EZEANYIM: Thank you very much.

THE WITNESS: Yes, sir.

EXAMINER EZEANYIM: Anything further?

MR. KELLAHIN: We're done.

EXAMINER EZEANYIM: At this point Case Number 13,820 will be taken under advisement.

(Thereupon, these proceedings were concluded at 9:19 a.m.)

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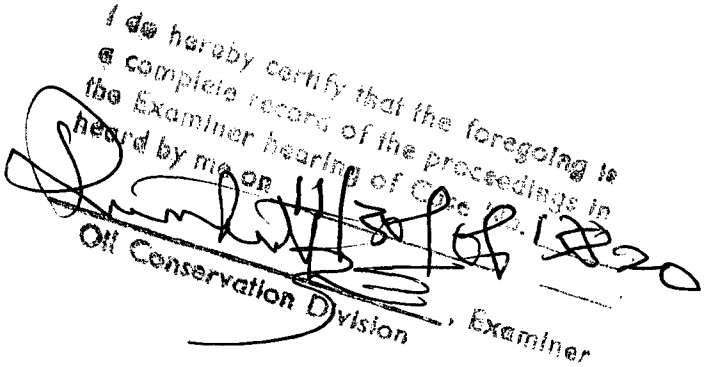

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL December 2nd, 2006.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 16th, 2010