NEW MEXICO OIL CONSERVATION DIVISION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NO. 10416

IN THE MATTER OF:

The Application of Presidio Exploration, Inc., for an unorthodox gas well location and simultaneous dedication, Eddy County, New Mexico.

BEFORE:

MICHAEL E. STOGNER

Hearing Examiner

State Land Office Building

December 19, 1991

ORIGINAL

REPORTED BY:

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Certified Shorthand Reporter
for the State of New Mexico

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EXAMINER STOGNER: This hearing will come to order. Call the next case, No. 10416.

MR. STOVALL: Application of Presidio Exploration, Inc., for an unorthodox gas well location and simultaneous dedication, Eddy County, New Mexico.

EXAMINER STOGNER: Call for appearances.

MR. BRUCE: Mr. Examiner, my name is Jim Bruce from the Hinkle law firm in Albuquerque representing the Applicant. I believe I have four -- three witnesses, and I have a potential rebuttal witness.

EXAMINER STOGNER: Any other appearances?

MR. CARR: May it please the Examiner, my name is William F. Carr with the law firm of Campbell, Carr, Berge & Sheridan of Santa Fe. I would like to enter my appearance on behalf of Santa Fe Energy Operating Partners, LP, and enter an appearance for Yates Petroleum Corporation. Yates Petroleum Corporation will have one witness.

MR. BRUCE: You'll be glad to know in this hearing I did bring engineers and

geologists.

MR. STOVALL: We'll let you wear the tie now, Mr. Bruce.

EXAMINER STOGNER: I don't know which other case you're referring to, Mr. Bruce.

Are there any other appearances?

Will all the witnesses, please, rise to be sworn.

(The witnesses were duly sworn.)

EXAMINER STOGNER: Any need for opening comments?

MR. BRUCE: I don't think so.

EXAMINER STOGNER: Okay, Mr. Bruce.

MARSHALL L. MUNSELL

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

EXAMINATION

BY MR. BRUCE:

Q. Would you, please, state your name and city of residence.

A. My name is Marshall Munsell, M-u-n-s-e-l-l. I live in Dallas, Texas.

Q. What is your occupation, and who are you employed by?

A. I'm a petroleum landman employed by

Presidio Exploration, Inc., in Dallas.

Q. Have you previously testified before the OCD?

A. No, I have not.

Q. Would you, please, summarize your educational and work background.

A. Earned a bachelor of business degree in petroleum land management from the University of Texas in Austin in 1980. I joined Sun Production Company in Dallas in 1980 as a landman, remained with Sun in that position until 1988, at which time I joined Presidio Exploration in Dallas as a landman, which is my current position.

My responsibilities include overseeing all land matters for Presidio's mid-continent division, which includes southeast New Mexico.

Q. Okay. And are you familiar with the land matters involved in this case?

A. Yes, I am.

Q. Have you previously qualified as a land expert in any other state commissions?

A. Yes, I have qualified as an expert land witness in Texas and Wyoming.

MR. BRUCE: Mr. Examiner, I tender the witness as an expert petroleum landman.

EXAMINER STOGNER: Are there any objections?

MR. CARR: No objections.

EXAMINER STOGNER: The witness is so qualified.

Q. (BY MR. BRUCE) Mr. Munsell, would you state briefly what Presidio seeks in this case?

A. Yes. Presidio seeks the OCD's approval to drill an infill well to the East Burton Flat-Strawn Gas Pool in the northwest quarter of Section 1, 20 South, 29 East, Eddy County, which well we have designated as a Superior Federal No. 10 well and simultaneously dedicate the north half of Section 1 to both the infill well and Presidio's existing Superior Federal No. 9 well, which is located in the northeast quarter of Section 1.

If the proposed well is successfully completed, Presidio requests permission to produce both wells simultaneously.

Presidio is also requesting permission to drill the infill well at an unorthodox location at 1300 feet from the north line and 1300 feet from the west line of Section 1 for reasons which will be discussed in more detail by

our geologic and engineering witnesses.

Q. Would you, please, refer to Presidio Exhibit No. 1 and explain its contents for the Examiner?

A. Yes. Exhibit 1 is a land plat of Section 1 and the adjoining sections, which shows Presidio's Superior Federal No. 8 well, which is in the south half of Section 1, and the Superior Federal No. 9 well in the north half of Section 1.

Both the No. 8 and No. 9 are spaced on lay-down units, 320-acre units. The proposed Superior Federal No. 10 well's location is indicated on the plat on the yellow dot. Finally, the plat indicates all offset operators or lessees, if there is no operator.

Q. Were these offsets notified of this application?

A. Yes, they were. Exhibit No. 2 is an Affidavit of Notice, which is signed by myself, and includes a copy of my notice letter along with copies of the certified mailing receipts.

Q. Were Exhibits 1 and 2 prepared by you or under your direction?

A. Yes, they were.

Q. And in your opinion is the granting of this application in the interests of conservation and the prevention of waste?

A. Yes, it is.

MR. BRUCE: Mr. Examiner, I move the admission of Presidio Exhibits 1 and 2.

EXAMINER STOGNER: Are there any objections?

MR. CARR: No objections.

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

Now, Exhibit No. 1, I show the offset operator is Santa Fe, Meridian, Siete, Chevron, Yates, and Presidio. But Exhibit A of Exhibit No. 2 has a lot more names. Can you elaborate on who these people are?

THE WITNESS: Yes, sir. We went ahead and provided notice of the application to all of the participants, the working interest owners in the existing Superior Federal 8 and 9 wells. So those are the existing partners in those wells.

EXAMINER STOGNER: Okay. Are there any other questions of this witness?

MR. CARR: Briefly.

EXAMINER STOGNER: Mr. Carr.

EXAMINATION

BY MR. CARR:

Q. Mr. Munsell, Yates is listed on your Exhibit A as having received notice of the hearing. Is Yates just an offset operator, or do they also own an interest in the Superior Federal wells?

A. They own an interest in the Superior Federal No. 9 only, not Superior Federal No. 8.

Q. Do you know what that interest is?

A. Their aggregate interest, Yates and their group, is 25 percent.

MR. CARR: That's all I have. Thank you.

MR. STOVALL: They chose the same interest in the new well; is that correct?

THE WITNESS: That's correct.

EXAMINER STOGNER: Okay. Any other questions? If not, you may be excused.

MR. BRUCE: Call Mr. Fear to the stand.

EXAMINER STOGNER: Okay, Mr. Bruce.

ALAN J. FEAR

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

EXAMINATION

BY MR. BRUCE:

Q. Would you, please, state your full name and city of residence.

A. My name is Alan Fear, and I live in Dallas, Texas.

Q. And what is your occupation, and who do you work for?

A. I'm working for Presidio Exploration as a petroleum geologist.

Q. Have you previously testified before the Division as a geologist and had your credentials as an expert accepted as a matter of record?

A. Yes, I have, and yes, they were.

Q. And are you familiar with the geology involved in this case?

A. Yes, I am.

MR. BRUCE: Mr. Examiner, I tender Mr. Fear as an expert petroleum geologist.

EXAMINER STOGNER: Are there any objections?

MR. CARR: No objections.

EXAMINER STOGNER: Mr. Fear is so qualified.

Q. (BY MR. BRUCE) Mr. Fear, please refer to Exhibit 3 and identify just what is included in that exhibit.

A. The exhibit consists of a structure map, a cross-section, an isopach, and a Strawn field designation map.

Q. Okay. Referring to the structure map on Exhibit 3, would you discuss the geology of this pool?

A. Yes. The structure map is constructed on the top of the Strawn limestone and is drawn using a 50-foot contour interval. The top of the Strawn was selected based upon gamma ray response, indicating low radioactive content, clean limestone.

The Strawn exhibits southeast dip in Section 1 with the northwest quarter being the highest structural area of the lease. Both the structure and isopach maps show Presidio's proposed location indicated by a yellow dot and a dashed-red line showing the location of the cross-section used for this exhibit.

Q. Okay. And moving on to the cross-section and the isopach, would you discuss those.

A. The cross-section traverses from the west at the Chevron and State well, which is in the northeast quarter of Section 2 through the proposed location to the Superior Federal No. 8 in the southwest quarter of Section 1 to the Superior Federal No. 9 well in the northeast quarter of Section 1.

Both the Superior Federal No. 8 and No. 9 wells were drilled by the Petroleum Corporation of Delaware, which is now Presidio Exploration, Inc.

The cross-section shows the Strawn divided into the A, B, and C zones. The A zone is the primary productive horizon with the C zone also open in the majority of the wells. The C zone's contribution to production is probably limited due to very modest porosity and permeability development.

A productive B zone is open in the Yates and to the State well in the southeast quarter of Section 2, which pinches out in the north and east offsets, being the Chevron Eddy State well in the northeast quarter of Section 2 and the Superior Federal No. 8 well in the southwest quarter of Section 1.

The B zone could be developed in the northwest quarter of Section 1 and would be essentially undrained since the Superior Federal No. 8 and 9 wells did not encounter the zone with reservoir porosity.

The cross-section depicts the Strawn A zone pinching out in the Chevron Eddy State well. The porosity pinch-out forms an up-dip perm barrier, which stratigraphically seals the reservoir creating the trapping mechanism for hydrocarbon emplacement.

The permeability barrier can be projected northeast and southwest of the Chevron Eddy State well. It is the perm barrier which essentially separates the Strawn reservoirs in the west part of the pool, Sections 5, 6, 7, 8, and 9, from the reservoirs producing in the eastern part of the East Burton Flat Strawn Pool.

Q. Okay. So is what you're saying is that the Strawn wells, which are all marked in green, although they're all on the East Burton Flat Pool, there's two separate reservoirs?

A. Yes, sir.

Q. Would you, please, continue with your

discussion.

A. Yes. I'd like to refer you to the isopach map. The isopach map is a net porosity map constructed employing a porosity cutoff greater or equal to 2 percent. The 2 percent figure was calculated by cross-plotting the density and neutron porosities arriving at an average of the two porosity readings.

The 2 percent cutoff was used in an attempt to map pore volume that is contributing to production. Using a higher porosity cutoff would yield a zero value to the well that's -- to the TXO Burton Flat Federal No. 1 well, which is now operated by Marathon completed in the northwest quarter of Section 14, which is a producer.

The Strawn A zone in this area of Eddy County was deposited as a low-relief carbonate buildup. This carbonate buildup consists of randomly-occurring porosity stringers within the A, B, and C zones.

Strawn A porosity is considered to be related to algal mound development. This carbonate feature exhibits a northeast-southwest orientation, as you can see from the isopach map,

and is approximately five miles long and one-and-a-half miles wide.

Both the geometry of the reservoir and the productive porosity range of 2 to 12 percent are indicative of algal mound type reservoirs. Algal mound reservoirs generally exhibit preferential matrix permeability related to algal grain stone deposition.

Personal examination by myself of Strawn cutting samples in this Superior Federal No. 8 and No. 9 wells shows the reservoir rock to be an algal grain stone. This preferential matrix permeability yields maximum drainage occurring in a northeast-southwest direction parallel to the long axis of the algal mound.

Any naturally-occurring fractures would also align in a northeast-southwest orientation, again parallel to the long axis of the algal mound.

Electrical log analysis supports fracturing as indicated by caliper washout and large separation in resistivity readings between the shallow and deep resistivity tools.

These directional permeability trends would indicate that the effective drainage

pattern is preferentially occurring along a northeast-southwest trend.

This means the existing wells are not effectively draining reservoir under the northwest quarter of Section 1. Therefore, to effectively and efficiently recover hydrocarbons in the northwest quarter, a well would have to be drilled.

The isopach indicates significant pore volume should be encountered in the northwest quarter of Section 1 in the Strawn A zone. Thus from a geologic standpoint, the northwest quarter of Section 1 is a favorable location for an infill well.

Now, for purposes of isopaching, the Strawn A zone was treated as a continuous uniform zone, which is not always the case. If you'll look at the cross-section, please observe the Superior Federal No. 9 well on the east side, the far right side of the cross-section.

A basal porosity zone was encountered in the No. 9 well, and it's colored in red. Moving south and west to the No. 8, both the basal number, the red, and a middle number, the green, were encountered.

Some upper A porosity above the middle member is trying to develop in the No. 8, and I colored that in yellow. This leaves the possibility for additional productive reservoir rock forming in the northwest quarter of Section 1, which is essentially undrained by the existing No. 8 and No. 9 boreholes.

Considering the random porosity development, it is a distinct possibility to encounter multiple zones with high pore volume by drilling a well in northwest quarter of Section 1 and recover hydrocarbons that would not be otherwise recovered.

Q. Okay. Would you refer to the field designation map in the upper right-hand corner of your exhibit and identify the Strawn pools in the area and discuss the spacing of those pools.

A. Yes. If you would look, the green circles represent the East Burton Flat Strawn Pool, which is a gas pool spaced on 320 acres.

The blue triangles on the north part of the map are the Parkway Strawn Pool, which is an oil pool spaced on 160 acres. The Southland well in the southwest quarter of Section 25 produces from the Strawn A zone, which is the same

reservoir as the East Burton Flat Strawn Reservoir.

The brown triangle on the west side of the map is the Burton Flat Upper Strawn Pool, an oil pool spaced on 160 acres. The red triangle on the south part of the map is the South Parkway Strawn Pool, an oil pool spaced on 40 acres. Marathon is operating the well. It was drilled by TXO. It's the Williamson Federal No. 4 well, which I've indicated with the red triangle. It also produces from the Strawn A zone, which is the same reservoir as the East Burton Flat Strawn.

My conclusions are there are Strawn wells spaced on less than 320 acres. Also there are two existing wells spaced on less than 320 acres that are perforated in the same Strawn A reservoir as the East Burton Flat Strawn Gas Pool.

Also, please note, if you look on the map, the green circles in and around Section 11, 12, and north of that in Section 1 and Section 2, these wells are -- they're on effective 160-acre development.

The green circles in the north half of

Section 11, the northwest quarter of Section 12, the southwest quarter of Section 1, and the southeast quarter of Section 2, these five wells are effectively spaced on 160 acres. And a proposed well in the northwest quarter of Section 1 would fit in with this particular development.

Q. Was Exhibit 3 prepared by you or under your direction, Mr. Fear?

A. Yes, it was.

Q. In your opinion would the granting of this application be in the interests of conservation and the prevention of waste?

A. Yes, it would.

MR. BRUCE: Mr. Examiner, I move the admission of Presidio's Exhibit 3.

EXAMINER STOGNER: Are there any objections?

MR. CARR: No objections.

EXAMINER STOGNER: Exhibit 3 will be admitted into evidence.

Mr. Carr, your witness.

EXAMINATION

BY MR. CARR:

Q. Mr. Fear, the original well on the north half of Section 1 is the No. 9 well?

A. No. In the north half of Section 1, the first well was the No. 8 well.

Q. On this spacing unit?

A. Yes. You said the original well.

Q. In the north half?

A. Yes, the No. 9 well.

Q. When was that drilled; do you know?

A. Yes. Approximately 5 of 90 or 7. I have it written down here. 5/90.

Q. Were you the geologist involved in the drilling of that well?

A. Yes, sir, myself and another geologist, Michael Ducing.

Q. When you construct a map like the isopach map, what information are you using, your well control information only, or have you integrated some seismic work in there?

A. Strictly well control.

Q. As I look at this, you have a 40-foot contour on this isopach; correct?

A. Yes, sir.

Q. Do you have any well in the area that actually has, at a 2 percent porosity cutoff, 40 feet of pay?

A. Close. I have a 39. And conventional

contouring allows me to draw 40 in there.

Q. Do you have anything north of that that would suggest that you pull that 40-foot contour up like you have into the northwest of that section?

A. I have 22 feet up in Section 36, which allows me to bring a 30 up, which allows me to bring a 40 up.

Q. So that's the control point that causes you to pull that 40-foot contour up?

A. Not only that, the spacing between the -- the Anthill well has 37 feet, and I have 39 feet. So just by naturally contouring, it's got to be a pretty thick interval in there.

Q. There's nothing off to the north and west that would suggest that. You're going up to the Santa Fe -- is that the Santa Fe 22 well?

A. No. 22 is the datum.

Q. That's the datum point?

A. Yes. I believe the well is the 10-36.

Q. Now, when you worked on the No. 9 well, which you proposed last summer --

A. Yes.

Q. -- or summer a year-and-a-half ago, did you also do some isopachs of the zone?

A. Yes.

Q. Did you use a 2 percent cutoff in those?

A. Actually I've used about five or six different cutoffs: gross thickness, 1 percent, 2 percent, 4 percent, and I think I have a 6 percent also.

Q. Did you use anything less than the 2 percent cutoff?

A. Yes, I have a 1 percent and a zero, which would be just clean gamma ray.

Q. When you do that, the smaller the porosity cutoff, in fact, the smaller the drainage area you anticipate; isn't that right?

A. I don't know if I would be qualified to comment on that. That's more of an engineering question.

Q. If we look at this, what you're seeking is an additional well in the north half of the section?

A. Yes, sir.

Q. And based on your geological interpretation, this is the better location then?

A. Yes, sir.

Q. If you were drilling just one well, in

fact this would be -- it would be better to develop this in the northwest, would it not?

A. Well, you know, I got the No. 9 there telling me, I got the Fortson well over there giving me data, so I don't think that's really a fair question.

Q. The question I have is if you were drilling a well in the north half today, where is the best location? It's in the northwest, is it not?

A. Oh, I'm sorry. I misunderstood you. Yes, somewhere in the northwest.

Q. And you're proposing to leave both wells on production?

A. Yes, sir.

Q. Is there any geologic reason that you would need to put both wells on? Is there any potential harm from a geologic point of view to your correlative rights by being required to shut one well in at a time? I'm talking just about geology.

A. Would you repeat the question?

Q. Is it possible that you could produce the north half by shutting one well in, say, by a month and then going to the other well and

producing it? Is there any factor in your area of expertise that would say you shouldn't do that?

A. Well, if I were allowed to drill the northwest quarter, I may pick up other porosity stringers that I wouldn't have in the No. 9. So you wouldn't be producing all your reservoir if you shut one in.

Q. At any one particular moment?

A. Right.

MR. CARR: That's all.

MR. STOVALL: Mr. Carr, do you wish to incorporate a memorandum that may have been issued at some point in time?

MR. CARR: I may do that at some point.

MR. STOVALL: You weren't here this morning, I assume, Mr. Bruce?

EXAMINATION

BY EXAMINER STOGNER:

Q. You said you were around when the No. 9 well was drilled; is that correct?

A. Yes, sir, the No. 8 and the No. 9.

Q. Okay. How much did your contour map and your isopach map change after those two wells

were drilled?

A. After they were drilled?

Q. Yes.

A. Well, of course, I had more data to make the reservoir bigger up to the northeast.

Q. Did you obtain your --

A. Before we drilled the No. 8, there was basically -- the No. 4 Slinkard wasn't there; the Fortson well wasn't there; the Santa Fe well wasn't there. You just had the Anthill State, and it was just kind of a risky move to the east. You know, it may be there; it may not.

As a matter of fact -- yeah, that's basically my answer. As a result of drilling the 8 and 9, we've been able to delineate the extent of the reservoir now.

Q. What if you would have drilled your proposed location first?

A. In the northwest?

Q. Right. Would there be any need to have the No. 9 well today as an infill well instead of the other way around?

A. I'm not real sure.

EXAMINER STOGNER: Okay. Any other questions of this witness?

MR. BRUCE: I have one, Mr. Examiner.

FURTHER EXAMINATION

BY MR. BRUCE:

Q. Mr. Carr asked you, Mr. Fear, about the 2 percent cutoff, say, versus a 4 percent cutoff. I think you discussed it briefly in your testimony, but what led you to use that 2 percent cutoff?

A. If I moved up to, say, like a 4 percent value, then I had to produce a well that had zero as a value.

Q. Which well would that be?

A. That was TXO Burton Flat Federal well. The bottomhole location is in the northwest of Section 14. It's on the bottom of the structure and isopach maps.

Q. Yet that well is producing?

A. Yet that well produces. So that's why I felt like 2 percent was probably contributing to a productive core volume.

MR. BRUCE: Thank you.

EXAMINER STOGNER: I have no other questions of this witness at this time, maybe at a later point.

Any other questions, Mr. Carr? If not

he may be excused.

Mr. Bruce.

MR. BRUCE: Call Mr. Wolfarth to the stand.

MR. STOVALL: Mr. Bruce, before we get started with the next witness --

(A discussion was held off the record.)

EXAMINER STOGNER: Mr. Bruce.

CHRIS WOLFARTH

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

EXAMINATION

BY MR. BRUCE:

Q. Mr. Wolfarth, would you state your full name for the record and your city of residence.

A. My name is Chris Wolfarth. I am presently living in Englewood, Colorado.

Q. Have you previously testified before the Division?

A. No, I have not.

Q. Would you, please, state your educational and work background.

A. Yes. I have a bachelor of science degree in chemical engineering from the University of Pittsburgh in Pittsburgh,

Pennsylvania. I worked for Amoco Production Company for four-and-three-quarter years as a petroleum engineer specializing in operations and reservoir engineering.

Following that period I was employed by Freeport McMoran for two-and-a-half years as a senior reservoir engineer. I then worked for Kaiser Energy for two years as senior petroleum engineer specializing in operations and reservoir engineering.

Since August of 1987 I've been employed by Presidio as a petroleum engineer. And my duties with Presidio include operations engineering, well economics, production forecasting, estimating reserves, and evaluating acquisition and divestiture opportunities for the company.

Q. Does your area of responsibility at Presidio include southeast New Mexico?

A. Yes, it does.

Q. Are you familiar with the engineering matters related to this application?

A. Yes, I am.

MR. BRUCE: Mr. Examiner, I tender Mr. Wolfarth as an expert in petroleum engineering.

EXAMINER STOGNER: Mr. Wolfarth is so qualified.

Q. (BY MR. BRUCE) Mr. Wolfarth, would you summarize what Presidio's position in this case is and the reason it's asking to drill the infill well?

A. Yes. It's Presidio's opinion that the two wells located within Section 1 are incapable of draining gas and condensate reserves underlying their designated units. These wells are the Presidio Superior Federal Well Nos. 8 and 9.

Therefore, an additional well, which we'll call the Presidio Superior Federal No. 10 well, is a necessary well for developing these undrained reserves within Section 1.

Q. Have you performed a reservoir engineering and production performance study of this Strawn reservoir under consideration?

A. Yes, I have. My engineering study concentrates on the production behavior of 11 wells, all of which are producing from the Strawn A reservoir. These wells are operated by Presidio, Yates Petroleum Corporation, Marathon Oil Company, Fortson Oil Company, and Santa Fe

Energy Resources.

The wells are highlighted in yellow on Alan Fear's isopach map, which was previously discussed in Exhibit No. 3.

Q. Would you, please, discuss the reservoir's production characteristics, and I refer you to Exhibits 4-A through 4-C.

A. Yes. Exhibit No. 4-A displays in a tabular form gas condensate and water production for the described wells on both a monthly and a cumulative basis. From this information I have calculated gas-oil or gas-condensate ratios, percentage water and percentage water cuts. The information is updated through September 30 of 1991.

First continuous production from the reservoir occurred during January of 1988. Since that time approximately 3.5 Bcf of gas, 1.1 million barrels of condensate and 54,000 barrels of water had been removed from these wells.

I'd like to present the information in a graphical format on Exhibit No. 4-B. This exhibit is a plot of monthly condensate production, GOR, and number of active completions versus cumulative condensate production.

From the plot you can see that the reservoir withdrawal rate has risen from its initial rate of approximately 2100 barrels per month from two completions to its present rate of 52,467 barrels per month from 10 completions.

Santa Fe's well, the eleventh completion, is not represented in this data since the well was undergoing testing operations at the time of my study.

From the GOR information presented, monthly gas withdrawals are calculated to have increased from approximately 3.4 million cubic feet per month to approximately 147 million cubic feet.

It's important to notice that the GOR's have remained essentially constant during this time period and have averaged 3,116 cubic feet per barrel.

Exhibit No. 4-C is a plot of percentage water cut versus cumulative condensate production. From this plot you'll notice that the percentage water cuts from these completions have ranged from only -- or have ranged from zero percent to only 2 percent up through about 790,000 barrels of recovery.

Water percentages increased to approximately 17 percent for a short time period but have since declined to 9 percent. This brief increase in water production is believed to have occurred as a result of certain acid stimulation workovers performed in the period and as a result of certain wells completed on the flank of the structure and near to the hydrocarbon-water transition zone. The number of active completions is also shown on this graph.

I have also prepared similar tabular and graphical data on an individual well basis for the OCD's review. And unless you would like to discuss it on a per-well basis, I'll submit it as Exhibit No. 5.

Q. Have you studied production performance and reservoir pressure response in relationship to reservoir fluid withdrawal?

A. Yes, I have.

Q. And what are your findings with respect thereto?

A. PBT data obtained from both the Presidio Superior Federal No. 8 well and the Yates Slinkard UR Federal No. 2 well both agree that this is a gas reservoir with a dew point

pressure in excess of 4500 PSI.

This means that when the reservoir pressure declines below the dew point pressure, a dramatic increase in the producing GOR would be expected. From initial production to date, this has not happened in any well within the study area, and there are no exceptions.

Exhibit No. 6 is a representation of reported reservoir pressure from April 2 of 1984 through July of 1991. The information is comprised of drill stem test data and pressure buildup surveys from nine of the reservoirs' eleven completions.

Original reservoir pressure is estimated to have been 4,789 PSI. This was measured in the Yates Slinkard UR Federal No. 2 well on May 16, 1984, following a 521-hour shut-in period.

The most recent pressure survey was conducted upon drill stem tests in the Yates Slinkard UR Federal No. 4 well during July of 1991. This well reported a reservoir pressure of 3,280 PSI following a three-hour shut-in period.

Since the producing GOR's have remained constant, I have strong reason to believe that

this final pressure does not represent the true matrix reservoir pressure. The Strawn formation is a carbonate formation, as Alan discussed, which characteristically possesses low permeability.

In sampling pressures in this type of formation, up to several weeks of shut-in time may be necessary to measure representative reservoir pressures. To date we are relying on short-term buildups.

The lower pressures measured in these wells on Exhibit No. 6 more closely represent pressure within the natural fracture system of the reservoir and not that of the matrix system where the vast majority of the reservoir's hydrocarbons are contained.

Q. Mr. Wolfarth, what do you conclude from your study of production performance and bottomhole pressure observations?

A. My conclusions are that, number one, the reservoir is not experiencing any detrimental effects of retrograde condensation observed from GOR stability.

Number two, there is essentially no aquifer encroachment, as observed from low

percentage water constant produced fluids.

And, number three, the reservoir drive mechanism is depletion drive.

Q. Have you calculated recoverable reserves by volumetrics under Section 1? And I would refer you to Exhibits 7-A through 7-D.

A. Yes, I have. Exhibit No. 7-A displays the volumetric parameters, calculations of gas in place, recoverable gas in place, and percentage recovery for the Superior Federal No. 8 well.

The reservoir temperature of 160 degrees Fahrenheit is averaged from temperatures measured from the Yates Eland AFC Federal Com. No. 1, Slinkard UR Federal Nos. 1 and 4, Presidio Superior Federal Nos. 8 and 9, Fortson Sylvite Federal No. 1, and Santa Fe East Burton Flat 36 State No. 10 wells.

Temperatures measured in the Yates UR Federal No. 2 and Anthill AAK State No. 1 wells were not included in this average since it is thought that these higher temperatures more closely represent those in the Morrow formation, which is approximately 550 feet below the base of the Strawn.

The reservoir pressure used a 4,030 PSI

as the pressure measured during drill stem testing procedures on May 6 of 1990 in the Superior Federal No. 8 well.

Porosity values are identified through well log interpretation and average 6.54 percent over the wells' net pay interval. Water saturations, gas deviation, and formation volume factors are calculated values.

From these parameters, original gas in place is calculated to be 440 Mcf per foot. Assuming a depletion-drive-recovery mechanism with 1500 pounds of PSI or abandonment pressure, recoverable gas in place calculates to be 279 Mcf per acre foot, representing the 62 percent recovery factor.

Shown on Exhibit 7-B are volumetric data and similar calculations for the Superior Federal No. 9 well. For this well original gas in place and recoverable gas in place calculate at 535 Mcf per acre foot and 322 Mcf per acre foot respectively. A recovery factor of 60 percent is calculated for this well.

Exhibit No. 7-C is a net pay weighted average recoverable gas in place calculation of Section 1. Applying 39 feet of net pay in the

Superior Federal No. 8 well and 10 feet of net pay in the Superior Federal No. 9 well, the weighted average recoverable gas in place calculates to be 288 Mcf per acre foot.

From this, volumetric recoverable reserves for Section 1 are estimated to be approximately 4.95 Bcf of gas and 1.1 million barrels of condensate. The pore volume underlying Section 1 is calculated at 17,190 acre feet. And these calculations are represented on Exhibit No. 7-D.

Q. Of your reserve estimate what do you expect will be recovered by the Superior Federal Nos. 8 and 9 wells? And I would refer you to Exhibit Nos. 8-A through 8-C.

A. Exhibit Nos. 8-A and 8-B are graphical representations showing the historical production and production forecasts for the No. 8 and No. 9 wells. Exhibit No. 8-C shows calculations of remaining and ultimate recoverable reserves made from these projections.

On an aggregate basis, gross ultimate recoverable reserves are approximately 2.9 Bcf of gas and 754,000 barrels of condensate. Cumulative production as of September 30, 1991 is

807 million cubic feet of gas and 179,000 barrels of condensate for these wells.

The estimated remaining recoverable reserves by decline curve analysis are therefore 2.1 Bcf of gas and 575,000 barrels. A 30 percent annual decline rate has been applied to each well to arrive at these estimates.

Q. What are the unrecovered reserves underlying Section 1 if the infill well, the proposed No. 10 well, is not drilled?

A. That is shown on Exhibit No. 9 which compares ultimate recoverable reserves estimated volumetrically to those determined by decline curve analysis.

Again, the volumetric ultimate recoverable reserves are estimated to be approximately 4.95 Bcf of gas and 1.1 million barrels of condensate. The decline curve ultimate recoverable reserves are 2.9 Bcf of gas and 754,000 barrels. Undrained reserves underlying Section 1 are therefore estimated to be 2.1 Bcf of gas and 346,000 barrels.

Q. Will it be economical for Presidio to drill the No. 10 well in the northwest quarter of Section 1 to recover these reserves?

A. Yes, it will. Presidio's estimated completed well cost to drill a Strawn development well in this area is $776,000, an initial production rate of 1.2 million cubic feet of gas, and 200 barrels of condensate per day applied to current product pricing yields favorable economics. And this well is expected to pay out within nine months after deducting expenses and severance taxes.

Q. Why did Presidio choose the location for the proposed well 1300 feet from the north and west lines of Section 1?

A. The location was chosen for the following reasons: From a geological viewpoint this is the optimum location for developing Strawn A reserves. Up to 40 feet of net pay would be uncovered according to Al Fear's net pay isopach map. And this location is structurally high to existing production within Section 1.

From a reservoir conservation viewpoint, the well is centrally located in the northwest quarter of Section 1 in order to minimize adverse effects on offset producing wells and in order to comply with the current effect of 160-acre spacing that is apparent here.

Q. Would you further discuss any effects on the offsets to the north, northwest, and west.

A. Yes. Immediately to the west in the northeast quarter of Section 2, Chevron drilled, tested, and plugged back their Eddy State No. 1 well from the Strawn formation. Chevron demonstrated that the Strawn formation is not productive in this area.

Therefore, Presidio does not anticipate any adverse effects to occur from under Chevron's lease. And it should also be noted that Chevron is not protesting Presidio's proposed location.

To the north in Section 36 drainage from the proposed well is not expected to be detrimental to Santa Fe's lease. Within Section 36 in the northwest quarter, Santa Fe has already approved that portion of the section to be noncommercial with the unsuccessful test of their No. 136 well.

In the southeast quarter of Section 36, it was also demonstrated to be nonproductive by Santa Fe in their 10-36 well. Although this well drill stem tested oil from the Strawn A formation, subsequent testing has reportly

resulted with high water cuts, and this noncommercial well has now been shut in for the past eight months past its completion date.

Also note that if we do make a successful completion at our No. 10 location, we will prove or could prove the southwest quarter of Section 36. Presidio thinks that a well should be drilled in this area and in fact has actively sought a farmout from Santa Fe to drill a well in this area.

Moving over to Section 35 from Al's isopach map, we don't expect any detrimental effects to occur from within the southeast quarter of that section due to the fact that we have a porosity pinch-off moving in that direction.

Q. Okay. Would you summarize Presidio's position then in this application.

A. In summary, reserves amounting to 2.1 Bcf of gas and 346,000 barrels of condensate will be left in the ground if an additional well is not drilled in the northwest quarter of Section 1. Based on that Presidio believes that this application should be granted to prevent waste.

Q. Were Exhibits 4 through 9 prepared by

you or under your direction?

A. They were.

MR. BRUCE: Mr. Examiner, I would move the admission of Presidio Exhibits 4 through 9.

EXAMINER STOGNER: Are there any objections?

MR. CARR: No objections.

EXAMINER STOGNER: Exhibits 4 through 9 will be admitted into evidence.

Mr. Carr, your witness.

EXAMINATION

BY MR. CARR:

Q. We are talking about the East Burton flat field; is that correct?

A. That is correct.

Q. Do you know if that's a prorated field or not?

A. It's a prorated field.

Q. It is a prorated field?

A. It's not a prorated field. Excuse me.

MR. STOVALL: They have an exhibit that says that, Mr. Carr.

THE WITNESS: Is that okay? I picked it up off the exhibit. I apologize.

MR. CARR: That's no problem. It's

refreshing to see another technical witness that doesn't know that.

MR. STOVALL: That's legal type stuff.

MR. CARR: I just wanted to be able to say that.

Q. (BY MR. CARR) You studied eleven wells; is that what you indicated?

A. Yes, eleven.

Q. And you included in the study the Yates Slinkard UR Federal No. 1 well, I believe?

A. That's correct.

Q. Well, let's go to your Exhibit No. 6. That would give us something to work from. We've got the Slinkard UR Federal No. 2 well as the first well on there. And if I read this correctly, the first -- is that the day it was completed or first produced, the date column?

A. The date, I believe, is the date of completion.

Q. And then we have a bottomhole pressure that is reflected under your reservoir column of 4,647?

A. Correct.

Q. Now, if we go down and we find in 1990 the first Presidio well listed, your Superior

Federal No. 8, we've had a decrease in the bottomhole pressure in the reservoir of, oh, by your calculation, what, 650 pounds, 600 pounds, something like that?

A. The pressure measured on May 6 of 1990?

Q. Yes.

A. That is the pressure that was recorded after a three-hour drill stem test.

Q. If we look at these, you've got them really in chronological order, do you not?

A. I do, yes.

Q. And the bottomhole pressures show a regular decline from top to bottom in this well?

A. That's right.

Q. Doesn't this suggest to you the wells in this pool as a whole are draining fairly large areas?

A. It doesn't necessarily reflect drainage across the individual wells. As I testified earlier, we feel that the pressures measured in these wells are more representative of the pressure within the fracture system of the reservoir. And that fracture system will be or may be in communication more easily between wells

than the matrix formation pressure will be.

Q. What would cause these pressures to decline over this period of time other than production? Anything?

A. No.

Q. And it would show that whether it's in the fractures or in the matrix of the formation that there is communication between wells over a large area; isn't that fair to say?

A. Communication in a large area, but the area that we're studying again is, as Alan testified, trending in the northeast to southwest direction. And we feel that if there is pressure communication between the wells, it would be along the natural fracture system of the formation.

Q. When you studied these wells, your study was basically a field-wide study in this portion of the field, this eastern portion of the field?

A. Field-wide, including the wells that I indicated.

Q. Do you have an opinion on whether or not wells throughout the field are draining less than 320 acres, or is it just the No. 9?

A. I would, from what I've studied in Section 1, both the Superior Federal No. 8 and No. 9 wells are draining less than 320 acres.

Q. Can you testify as to whether or not that same situation, say, would apply to the Yates' wells in Section 11?

A. I haven't studied it to that degree, no.

Q. If we look at the No. 8 and 9 wells, the Presidio wells, are they basically on the eastern flank of the field?

A. Basically, yes.

Q. And couldn't that be one of the reasons they were draining a smaller area? It's just a poorer reservoir over there, or there's less of it?

A. Well, not necessarily. If you go back to Al's isopach map, we do pick up some of the higher quality reservoir within the Superior Federal No. 8 well, so I don't think that's a representative statement for those two wells.

Q. They're not on the eastern edge of the field?

A. No. They are on the eastern edge of the field.

Q. Now, the proposed location --
A. Okay.
Q. -- this location is necessary, according to your testimony, to produce the reserves under the north half; is that fair? I'm not trying to put words in your mouth. You can tell me if I'm wrong.

My understanding of your testimony was you need this location to produce the reserves that are under the northwest quarter of Section 1?

A. Undrained in Section 1 in the northwest quarter.
Q. And without it those reserves won't be produced?
A. That's correct.
Q. And if I look at your testimony about you're not experiencing a retrograde condensation, you don't have water encroachment, your testimony about your depletion rate, was that directed at saying you can increase the withdrawal without having a reservoir problem, or am I missing what you're trying to say with that conclusion?
A. The statement was made to say that we

will not have any detrimental effects to the reservoir with an additional tape point. Retrograde condensation has not become a problem.

Q. So you can do this -- you can add the additional without risking reservoir problems; is that what you said?

A. That is correct.

Q. Is there any reason that you couldn't produce the well at the proposed location one month, shut it in, produce the well at the old location the next month, and not -- by that mechanism be able to produce the reserves that are under the northwest quarter?

A. Again, that was -- I guess that was the same question you asked Al earlier. I don't think you would benefit by producing a well and shutting in the other well for the reason that Al had mentioned earlier was that we may be opening up some additional reservoir rock in the new location and to the effect that we don't know if we are experiencing any drainage from the Superior Federal No. 9 or the No. 8 well into the northwest direction in Section 1.

Q. If you did alternate the wells so you would have your well in the northwest quarter and

you would be able to get those reserves ultimately, would you not?

A. Yes. I mean you would be able to produce and obtain those reserves.

Q. You're not proposing to plug and abandon the old well when you get this one?

A. No.

Q. It still has a long producing line?

A. Oh, yes.

Q. Have you made any estimates of what pressure you're anticipating you will encounter at the No. 10 location? Is that something you can do?

A. Well, it would probably be based upon the PVT data that we had talked about earlier. Knowing that we are not below a dew point pressure, and the dew point pressures were estimated to be somewhere in excess of 4500 pounds, that we should drill or tag in to our reservoir pressure above the dew point pressure, let's say 4500 pounds or more.

Q. So you're anticipating that you'll tag into a pressure in that well that is higher by some --

A. By the matrix pressure, yes.

Q. And are these matrix or fracture or do you know?

A. I cannot say for sure which ones they are. They're just reported pressures from either the buildup survey or from the drill stem test.

Q. So you're expecting a matrix pressure that is about 500 pounds above any of the recent -- the two Presidio wells which you recently drilled in the area?

A. It's possible.

Q. You have to drill it to see?

A. It's a way to test it, yes.

MR. CARR: That's all I have. Thank you.

EXAMINER STOGNER: Thank you, Mr. Carr.

Mr. Bruce, any redirect?

MR. BRUCE: Just briefly, Mr. Examiner.

FURTHER EXAMINATION

BY MR. BRUCE:

Q. Mr. Carr asked you about producing on alternate months. Do you think this is necessary, producing the No. 9 well and the proposed No. 10 well?

A. No.

Q. Do you think it will harm the reservoir to produce both simultaneously?

A. No.

MR. BRUCE: Thank you, Mr. Examiner.

EXAMINATION

BY EXAMINER STOGNER:

Q. In looking at your Exhibit No. 9, the undrained reserves in Section 1 -- 2.1 Bcf and 345,000 barrels, now if this well was not drilled, that would remain undrained, or would that production be drained by the Chevron well or the Yates Anthill well?

A. It's my opinion that those reserves would remain undrained. The Chevron well is abandoned in the Strawn formation. It was actually an unsuccessful test in this formation. And I don't anticipate that the Yates Anthill well will recover those reserves.

Q. So those reserves would just be there, and you're not really drilling the well for protection of correlative rights because the production is not being drained; is that correct?

A. Correct.

Q. Okay. Should this whole reservoir be spaced on 160?

A. Not at this time. We feel that it's too early to make that determination for the entire pool, and we wouldn't want to impose any development obligations on other offset operators if it is unnecessary for them, if they do not see it within their existing leasehold position.

So we're not seeking to de-space the pool, but just requesting this infill, this one infill location.

Q. Could this information perhaps be utilized at a later date for changing -- not changing spacing, but allowing infill throughout the pool?

A. I believe it would be, yes.

EXAMINER STOGNER: Any other questions of this witness?

MR. CARR: Maybe one.

FURTHER EXAMINATION

BY MR. CARR:

Q. On the pressure numbers again, you talked about having a 4500 -- you anticipated the 4500?

A. It's possible, yes.

Q. Have you used a pressure in that range in any of your volumetric calculations?

A. I used the vicinity of 4,000 PSI.

Q. And if you anticipate a matrix pressure of 4500 in the proposed well location, wouldn't that have been logical to have used that in the volumetric calculations for, say, the other well in the north half?

A. I could have used a higher reservoir pressure, but in turn what that would have shown is that we would have had additional reserves undrained within Section 1. There is perhaps a little gray area within the pressure reservoir, pressure matrix versus fracture pressure, and this is a more conservative approach to it.

MR. CARR: That's all. Thank you.

EXAMINER STOGNER: Any other questions of this witness? If not, he may be excused.

MR. BRUCE: That concludes my direct presentation.

EXAMINER STOGNER: Mr. Carr, did you submit a prehearing statement?

MR. CARR: Yes, Mr. Stogner, we did. We were late. It came in Tuesday.

EXAMINER STOGNER: I just want to see what Yates' opinion was.

MR. BRUCE: They didn't express one,

Mr. Examiner.

EXAMINER STOGNER: I was just saying how concise it is.

DAVID F. BONEAU

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

EXAMINATION

BY MR. CARR:

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

A. David Boneau is my name.

Q. And where do you reside?

A. I live in Artesia, New Mexico, where I work for Yates Petroleum Corporation.

Q. And what position do you hold with Yates Petroleum Corporation?

A. My position is called reservoir engineering supervisor.

Q. Have you previously testified before this Division?

A. Yes, sir.

Q. Were your credentials as a petroleum engineer accepted and made a matter of record at that time?

A. Yes, sir.

Q. Are you familiar with the application filed in this case on behalf of Presidio?

A. Yes, sir.

Q. And are you familiar with the portion of the East Burton Flat area that's involved in this case?

A. Yes, sir.

MR. CARR: Are the witness' qualifications acceptable?

EXAMINER STOGNER: Are there any objections?

MR. BRUCE: No, sir.

EXAMINER STOGNER: Mr. Boneau is so qualified.

Q. (BY MR. CARR) What does Yates Petroleum Corporation seek in this case?

A. Yates believes and Yates seeks that the NMOCD deny the application of Presidio for a second well on the 320-acre spacing unit in the north half of Section 1 of the township in question here.

We believe the well is not needed to effectively drain the East Burton Flat Strawn Pool. We believe that the wells in this pool can drain 320 acres or more.

My -- the main argument I came with relates to the fact that the wells drilled in developing the pool encountered reservoir pressure significantly below original reservoir pressure.

In other words, when the pool was developed on 320 acres, the development wells consistently encounter reservoir that had been partially depleted by earlier wells. This indicates that the wells could drain 320 acres or more.

And this indicates that Presidio's proposal to develop the north-half 160 acres is not appropriate. So we're seeking that the NMOCD deny their application.

Q. Have you prepared exhibits for presentation in this case?

A. I have prepared some exhibits, yes, sir.

Q. And other exhibits have been prepared for you?

A. I have five exhibits that I have prepared and supervised the preparation of.

Q. Let's go to what has been marked as Exhibit No. 1, and I'd ask you quickly to

identify and review this for Mr. Stogner. I think it's similar to a --

A. Exhibit No. 1 is a map showing the locations of the condensate wells in the East Burton Flat Strawn Pool. It contains no important information that wasn't shown in the Presidio exhibit.

Q. Let's move then to Exhibit No. 2. What does Exhibit No. 2 show you?

A. Exhibit No. 2 is a table listing bottomhole pressures measured at wells in the north portion of the pool. And some of the things that the Presidio experts said, I think, need a little elaboration -- or contradiction would be a better word.

I have listed on Exhibit 2 reservoir pressures for some Presidio wells and some Yates wells. I maintain that these are stabilized reservoir pressures. And they were -- they are all buildups for various lengths of time that were analyzed via computerized owner analysis and type curves, et cetera. And they all showed stable radial flow so that they were in a region where the pressures could be extrapolated to reservoir pressures.

So I am -- I'm trying to tell you that I believe a couple things: I believe that these numbers represent reservoir pressures. And by kind of inference I'm suggesting that the pressure analysis -- I'm saying that the pressure analysis shows no indication of the double-porosity system presented by Presidio. This is a matrix reservoir throughout.

Okay. With that out of the way, let me get back to my story.

Q. Okay. Let's go to the Slinkard UR Federal No. 2 on Exhibit No. 2 and start there.

A. Okay. The original reservoir pressure was 4822 PSIA, as shown on the first line of Exhibit 2. And that's an extrapolated pressure that's converted to this, to a common datum, so that the pressures are on a consistent basis. None of that is real relevant there.

The actual pressures measured at that well were in the 4800-pound range and stayed unchanged, may have gone up a little bit, but basically 4800 pounds.

Q. All right. And then why don't we locate that on Exhibit No. 3 for Mr. Stogner. That well is where?

A. Slinkard No. 2 is in the northwest of Section 11. The history of this, Mr. Examiner, is that the discovery well was drilled in 1982, the Slinkard No. 1. The Slinkard No. 2 was drilled in 1984, and another Yates well was drilled about that time frame. As Presidio testified, there was no production until January of 1988.

Okay. So the original reservoir pressure was around 4800 pounds, and Yates drilled the Slinkard No. 1 well in the northeast quarter of Section 11 and the Slinkard No. 2 well in the northwest quarter of Section 11 and the Anthill well in the southeast quarter of Section 2. And before there was any production, lines were run to it, et cetera, and production started in 1988.

Q. So the 4822 bottomhole pressure, indicated on Exhibit 2, is what you believe to be the original reservoir pressure or close to that?

A. Yes, sir.

Q. And you had production commence in 1988?

A. Yes, sir.

Q. Let's go now to the third well, the

third or fourth well on this exhibit, whichever you please and -- let's pick the second well, the Presidio Superior Federal No. 8 first, and let's review that.

A. Okay. In general what the exhibit shows, and it's similar to a Presidio exhibit, is that as additional wells were drilled, they always encountered pressures lower than the original pressures, significantly lower than original pressure.

Our Exhibit 3 is going to talk about -- line 2 of this, the Presidio Superior Federal No. 2, with a measured pressure of 4,044 PSI. And our Exhibit No. 4 is going to talk in a little more detail about the next two wells, the Fortson Sylvite well and the Presidio Superior Federal No. 9.

The rest that this exhibit shows is that as additional wells have been drilled, the Santa Fe well, the Yates Slinkard No. 4, the pressures have continued to decline down to the 32-, 3300 pound range.

Q. All right. Let's go now to Exhibit No. 3 and using the information from the second well on Exhibit No. 2, let's review this exhibit for

Mr. Stogner.

A. It's kind of handy to keep Exhibit No. 2 close by as we look at Exhibit No. 3. Exhibit No. 3 attempts to give a snapshot of the field at May 1990 when the first Presidio well was completed. The first Presidio well was tested on May 10, 1990. Pressure was measured at 4,044 pounds.

At that time Exhibit 3 shows that there had been production from wells, mostly from Yates' wells. The Anthill in Section 2 had produced 394 million cubic feet and 108,000 barrels of oil.

The Slinkard 1 had produced about half a Bcf and 171,000 barrels of oil. The Slinkard 2 had produced 374 million cubic feet and 122,000 barrels of oil. And there have been some relatively more minor production from some wells to the south.

So the original reservoir pressure was 4800 pounds. When Presidio drilled its first well, it encountered around 4,000 pounds. There was a loss of 800 pounds of pressure due to some production.

The production you see in Exhibit 3

here, there are -- the closest well to the Presidio No. 8 is the Slinkard No. 1. And I have drawn a circle around the Slinkard No. 1 that passes through the Superior Federal No. 8. Kind of gives me an impression that the drainage has been from that direction from that well. It's clearly been from the Anthill Slinkard 1 and Slinkard 2.

So that you have a situation where a well 3900 feet away has lost 800 pounds. A circle of that radius is 1100 acres. I'm not -- that's an indication that there is drainage in this reservoir over larger areas than 320 acres.

Q. Now, this occurred in approximately a three-year period of time?

A. Well, it occurred from production in 88, 89, and half of 90, yes, sir.

Q. And the new well was drilled in -- or started producing in June of 1990, two-and-a-half years later?

A. Yes, sir.

Q. Anything else on Exhibit No. 3?

A. I don't believe so.

Q. All right. Let's go to the information contained on Exhibit 2 on the next two wells, and

relate that to Exhibit No. 4.

A. Exhibit No. 4 is a similar exhibit. It attempts to be a snapshot around the start of 1991. The production data there is through December of 1990. This is the time when the Fortson Sylvite well started and approximately the time when the second Presidio well, the Presidio No. 9 well started. Again, we've listed the production as of December 1, 1990.

And Exhibit 2 shows you that both those wells, the Fortson Sylvite and the Presidio Superior Federal No. 9, had initial pressures in between 3716 and 3749, in the low 3700 pounds.

The location of those two wells had lost 1,000 pounds of original reservoir pressure. They had lost that pressure because of production at other wells.

The nearest other well is the Superior Federal No. 8, which had been producing for six to eight months at that time, and its cum is shown on Exhibit 4. I have drawn circles, almost circles, around the Superior Federal No. 8 that go through those two new wells, the Superior Federal 9 and the Sylvite well of Fortson.

One of those circles, if completed,

would be 600 acres; the bigger one would be 1500 acres. Again, we have drainage over areas bigger than 320 acres. There is a northwest-southeast line cutting through those circles. That is not a fault. Maybe it's my fault, but it's not a geologic fault.

It is simply there, not to tend to indicate that we realize that the Superior Federal No. 8 is not draining down in Section 11 where wells have been producing for three years.

It is simply a line drawn halfway between Slinkard 1 and Slinkard 8 perpendicular to a line between Slinkard 1 and Presidio No. 8. That was my misstatement.

Q. It just shows that if there had been drainage circles down into that area, they might have been misleading or inappropriate?

A. That was the idea. I'm sort of sorry that the line is on the map. But it's on there, and I need to explain why it's on there.

Q. So basically what this exhibit again shows is drainage over a large area based on pressure drawdown?

A. Yes, sir, that's what this data shows. And there's drainage over large areas.

Q. Now, based on your review of this reservoir and your knowledge of the reservoir, what conclusions have you been able to reach?

A. My conclusion is that these wells in the good part of the field, the Slinkards and what's shown as the Superior here, could drain -- would drain. The wells in the good part of the field would clearly drain more than 320 acres, and wells spaced on less than 320 acres are not appropriate.

Q. Now, have you done any volumetric work on this reservoir?

A. I have done some volumetric work. I have not done all the wells, just as Presidio has not done all the wells.

Q. Could you identify Exhibit No. 5 for Mr. Stogner, please.

A. Exhibit No. 5 is a calculation of drainage areas for the three main Yates wells of interest. The three Yates wells that are in the northwest portion of the field up towards the Presidio acreage.

Q. Now, can you explain the drainage acre figures that you've indicated on this exhibit?

A. Yes, I believe I can. The answer is in

the right-hand column. The numbers that lead to that right-hand column are called "Np," which is the oil production estimated from the decline curves, ultimate oil production estimated from decline curves.

The item called "Gp" is the gas ultimate estimated from decline curves. And the column called "Gpeq" is a sum of oil and gas production where the oil has been converted to equivalent gas.

The next column is called "Sgi-Phi-h," and that's the hydrocarbon pore volume determined from the logs of those three wells. And on cursory examination the Examiner will see that those numbers are not in the same ratios as the Presidio geologist showed.

And then the final column to the right are the calculated drainage areas for these three wells: the Anthill, 243 acres; the Slinkard 1, 147 acres; and the Slinkard 2, 360 acres.

The rest of the exhibit shows the parameters that went into the calculation of those drainage areas.

Q. When we look at these, the Slinkard UR Federal No. 1 in particular, we have a small

drainage area, how does that square with the remainder of your testimony here this afternoon?

A. The drainage area of the Slinkard No. 1 comes out to be smaller than 320-plus for a number of reasons.

The biggest reason, I think the Examiner understands, is that as the reservoir is developed on 320 acres, you constrain the wells to drain something in the range of 320 acres.

If you have a single well in the reservoir and it can drain 1100 acres, it is not going in reality to drain 1100 acres if you drill other wells within that 1100-acre drainage area. I think everybody understands that.

And that, by its very imposition, lowers these actual drainage areas. So the numbers here are conceptually different kind of numbers from the numbers I was quoting in the other part of the testimony. That's one reason.

A second reason is that the "Sgi-Phi-h" for the Slinkard No. 1 is a very big number compared to the other wells. And I would suggest that the thickness of the reservoir that occurred at that wellbore does not extend over the entire drainage area of that well. You don't have a

pancake that thick. It's just too thick. The pancake doesn't maintain that thick and it gets thinner out to the sides and so it extends to more acres.

And there is a third very strange reason why that number can be low. As Presidio testified, the main producing zone is what they call the Strawn A. The Slinkard No. 1 was completed until very recently in the Strawn C, and which I think is basically nonproductive, and it was communicating behind the pipe up to the Strawn A and producing from that. And that's a relatively inefficient way to produce. And that factors in reducing the drainage area.

Q. Dr. Boneau, why did you present these figures showing the small drainage areas?

A. I presented these figures because I think that Presidio would ask me what my figures were, and I have no intention of hiding them. These are they. We went to Dallas and talked to Presidio about this, and this is what we have to show. And it's what they are, and we need to get it out and talk about it here.

Q. Do you have an opinion based on your study of the reservoir as to what the proper

spacing units for wells should be in this field?

A. The wells in this field should be spaced on 320 acres.

Q. What recommendations can you make to the Examiner based on your study of the field and in regard in particular to Presidio's application?

A. We are asking for an all-or-nothing approach again, as in the previous case. My reasons for that are it just seems so clear that it's not appropriate, that it just plain ought to be turned down.

And the other part of our reason is that I've had some previous experience with trying to prorate wells in unprorated pools. And I'm sure you remember, you and I have fought on different sides of that issue at times in the past. And it just -- there is no way to make that work very well, and that's not something I recommend.

So it seems clear to me that the drainage in this field is large. In the main part of the field, Presidio drilled their No. 9 well, which we helped them in, in an unfortunate part of that spacing unit. But the drainage in

the main part of the field is clearly consistent with 320-acre spacing. And they should follow the rules.

And if a well is needed in the northwest, it needs to be the only well in the north half of Section 1.

Q. Do you have anything further to add to your testimony?

A. No, sir.

Q. Were Exhibits 1 through 5 prepared by you or compiled under your direction?

A. Yes, sir.

Q. Can you testify as to their accuracy?

A. I have checked their accuracy, and I believe them to be accurate.

MR. CARR: At this time, Mr. Stogner, we move the admission of Yates Exhibits 1 through 5.

EXAMINER STOGNER: Thank you, Mr. Carr.

Any objections?

MR. BRUCE: No.

EXAMINER STOGNER: Exhibits 1 through 5 will be admitted into evidence.

Mr. Bruce, your witness.

EXAMINATION

BY MR. BRUCE:

Q. Mr. Boneau, on your Exhibit 4 what does the straight line from the northwest to the southeast indicate?

A. The straight line from the northwest to the southeast is a line drawn midway between the Slinkard No. 1 and the Superior Federal No. 8 perpendicular to a line between those two wells. That's what it is.

What it indicates is that we thought -- I thought you all would get the wrong idea if we drew those circles down into an area that has been producing for three years.

Q. Are you saying --

A. I should have realized that you'd get the wrong idea if I drew a line preventing those circles from going down there too.

Q. Does this indicate that the Superior Federal No. 8 would be draining the Yates' wells down in Section 11?

A. No. I believe that the Superior No. 8 is not draining the Yates' wells down in Section 11. In fact, I've testified that the Yates' wells in Section 11 drained part of Section 1

before Presidio drilled wells in Section 1.

Q. Well, then wouldn't a well in the northwest quarter of Section 1 then not drain or not adversely affect the Yates' wells to the southwest?

A. I'm not sure this has any relation to my testimony, but I'll attempt to answer your question. A well in the northwest of Section 1, I'm suggesting, would attempt to have a 320-plus drainage area. Okay. The nearest Yates operated is the south half of No. 2 that contains the Anthill. And that corner is 1500 feet or something away from your well.

A 300-acre drainage area around your proposed location would clearly extend quite a way down into that south half of Section 2. But, on the other hand, Yates has been producing the south half of Section 2 for three years, and we would have a big jump on you.

Q. Okay. Looking at your Exhibit 5, did you perform any similar calculations on drainage of the Presidio Superior Federal No. 9 well?

A. No, I did not.

Q. Okay.

A. And I did not basically because the

production history of those wells is so short that you could extend the decline curve in myriad ways, and I could see no reason for getting into an argument with you over how I had extended that decline curve.

Q. Also looking at Exhibit 5, your Slinkard Fed. No. 1 well, where you indicated the small drainage radius, you said that was due to the "Phi-h." Is that due to the thicker pay to that well as opposed to the other wells you listed on there?

A. It's thicker, but if you look at that log, it has much higher porosity in the pay zone than the other wells. It has 10 percent over five to ten feet or something, which is unique at least among our wells. I can't say it's unique in the field because I don't remember all the logs. But it has higher porosity than our other wells, not that it's thicker, not so much that it's thicker, but that it has much better porosity in the pay.

Q. Looking at the map of -- any one of your maps there, Mr. Boneau, when was the Anthill AAK State well completed, or when did it begin producing, let's put it that way?

A. The Anthill began production from the East Burton Flat Strawn Field in July of 1988. It had previously been completed in the Morrow and had produced a couple years from the Morrow.

Q. Okay. And when did the Slinkard UR Federal No. 2 well begin producing?

A. The No. 2 and the No. 1 both began production in January of 1988.

Q. And when did the Federal No. 4 well begin producing?

A. 1991.

Q. It's a recent --

A. It's a recent well with very little production.

Q. But if you look at those four wells, Yates has effectively spaced its four wells on 160-acre units.

A. Exhibit 2 says that the Slinkard 4 began production in August of 91.

Q. But Yates' four wells there in that part of the pool are spaced on 160 acres effectively, aren't they?

A. That's a matter of semantics. They are an adjacent 160 acres.

Q. Well, if Yates really didn't want to

space wells on more than a -- on less than 320 acres, then why did it place its wells that way, especially the Slinkard No. 4?

A. Well, the Slinkard No. 4 -- again, we're getting down rabbit trails -- but the Slinkard No. 4 is where it is because it's trying to stay away from the water that's on the east edge of the reservoir.

And if you want me to say something more, clearly the Yates' geologist tried to place the wells within this 320-acre spacing unit so that they would be completed in what the Yates' geologist thought was the better part of the reservoir, just as I think the Presidio geologists attempt to do that.

Q. And the distance between the No. 4 well and the Federal -- Superior Federal No. 8 is, what, probably only about 13-, 1600 feet?

A. Yeah, they're relatively close. And if you extend the logic -- I'm trying to extend your logic -- if you look back at Exhibit No. 2, the initial pressure at the Slinkard No. 4 is quite a bit below the last pressure at Presidio No. 8.

And I interpret that to mean that the Slinkard No. 4 location has not been drained by

the Superior No. 8 as much as it has been drained by the Yates Slinkard No. 1, by the earlier wells.

Q. But the distance -- if the OCD granted approval for the proposed No. 10 well, the No. 10 well would be quite a distance from the nearest Yates' well, would it not?

A. Yes, that's true. And maybe I need to try to make it clear. I'm not jumping up and down saying that you're stealing our reserves. We're a partner in the well, if we would drill it. My feeling is that drilling it is a waste of your money and of Yates' money.

And my second reason is that the drainage information is just so clearly for large drainage areas that it's just wrong to do this. And I'm not -- no, I am not claiming that you're going to steal reserves, or that's way down my list of reasons for being here, is that you're going to steal reserves from the south half of Section 2.

Q. One final question, Mr. Boneau, are you aware of any Dst information indicating a two-porosity system on the Santa Fe 36 No. 10 well or on the Fortson Sylvite No. 1 well?

A. Tell me those wells again.

Q. The Santa Fe 36 No. 10 well located in Section 36 and the Fortson Sylvite Federal No. 1 well located to the east of the Superior Federal No. 9 well.

A. What I am aware is that we analyzed the entirety of the data from those Dst's, and we do not see any evidence of a dual-porosity system.

Q. And could you give me your explanation of why the GOR is not increasing if the pressures that everybody has listed, both Presidio and Yates, are correct as stated?

A. I have two answers to that. My first answer is I do not know. My speculation and the only speculation that makes much sense to me is that enough liquids have dropped out around the wellbores that there's a continuous flowing system of condensate near the wells that is maintaining the condensate rates at relatively constant levels.

I am puzzled by that phenomena, yes, sir.

MR. BRUCE: That's all I have, Mr. Examiner.

EXAMINER STOGNER: Any other questions

of this witness?

MR. CARR: No questions.

EXAMINER STOGNER: If not, he can be excused.

Do you wish to call any more witnesses, Mr. Bruce?

MR. BRUCE: Would you give us two minutes to discuss that?

EXAMINER STOGNER: I'll give you two minutes.

(A recess was taken.)

EXAMINER STOGNER: Mr. Bruce.

MR. BRUCE: I would like to call Bill Cobb to the stand, please.

WILLIAM COBB

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

EXAMINATION

BY MR. BRUCE:

Q. Mr. Cobb, would you state your full name and city of residence.

A. My name is William Cobb, and I live in Dallas, Texas.

Q. What is your occupation?

A. I'm a petroleum reservoir engineering

consultant.

Q. Have you been employed by Presidio Exploration, Inc., with respect to this case?

A. Yes, I have.

Q. Have you previously testified before the Division?

A. No.

Q. Would you, please, outline your educational and employment background.

A. I have a BS and an MS degree in petroleum engineering from Mississippi State and a Ph.D. in petroleum engineering from Stanford University. I worked for two years with Atlantic Richfield Company in their research lab in Dallas.

I taught petroleum engineering at Mississippi State for three years in the area of reservoir engineering and petroleum economics. I rejoined Atlantic Richfield and worked in their reservoir engineering group in Dallas.

I spent three years in -- two-and-a-half years in Midland, Texas, where part of the time I was responsible for Arco's gas development in southeast New Mexico. And, after leaving Arco a second time, I joined a

family-owned oil company, Cornell Oil, in Dallas.

And since 1983 I've headed up my own petroleum engineering consulting group, Cobb & Associates, in Dallas.

Q. And not only in this job for Presidio but in your past jobs, have you studied petroleum reservoir engineering matters with respect to this field and other fields in southeast New Mexico?

A. Yes, I have.

Q. And are you familiar with the reservoir engineering involved in this field?

A. I'm familiar with it, yes.

MR. BRUCE: Mr. Examiner, at this time I tender Mr. Cobb as an expert in petroleum engineering.

EXAMINER STOGNER: I assume you have no objections, Mr. Carr?

MR. CARR: I have no objections.

EXAMINER STOGNER: Dr. Cobb is so qualified.

Q. (BY MR. BRUCE) Mr. Cobb, you've been sitting here listening to the testimony of the witnesses, I presume?

A. Yes, I have.

Q. And it's probably become apparent to you that there's a little dispute over the pressure data?

A. Yes, that's correct.

Q. Would you give your opinion about the pressures in this pool taking into account the constant GOR and the other factors involved?

A. Yes. I think one of the most concise and correct pieces of data that we have in this particular pool is the actual production data, the gas production and the liquid production and the subsequent gas-oil ratios.

And if you look at the individual wells or if you look at the field as a whole, the gas-oil ratio since the date of first production in 1988, almost four years ago, has been for all practical matters constant, a little over 3100 standard cubic feet per barrel.

The PVT data that was obtained from a Yates Petroleum well in 1984 prior to any production indicates that the bubble point pressure -- I beg your pardon, the dew point pressure of this gas reservoir is approximately 4500 PSI.

And what this physically means or fundamentally means is that as long as the reservoir pressure remains above the dew point pressure, we expect the gas-oil ratio to be constant. And that's what we've seen.

Once the reservoir pressure declines below the dew point pressure, we expect to see the gas-oil ratio increase, and then we can see dramatic increases in the GOR.

So I think we have some questions that have been raised about the pressure data. We're talking about tight reservoir rock. And it may well be that the pressure data are not as accurate and reliable as we would like for them to be.

I think it's important for us to recognize that the GOR is above the dew point pressure. And the data, the PVT data, suggests that number to be something on the order of 4500 PSI.

Q. In short, you do not believe that 3300 is an accurate measure of current reservoir pressure?

A. I don't believe that's an accurate representation of the reservoir pressure at this

time.

Q. Final questions. Are you aware that there have been discussions regarding pressure maintenance and a pressure maintenance project for this pool?

A. Yes. It's my understanding that there have been some discussions between Presidio and Yates and possibly others.

Q. Would the proposed No. 10 well be useful for such a project?

A. Yes, it would. I think it would be advantageous for several reasons. It would give us additional control point which helps us more accurately describe the reservoir rock. It is my understanding that Presidio anticipates coring this well so that we will be able to determine something about the individual strata. And Presidio would expect in this particular well also to get an additional fluid analysis.

And all of these three could go a long way towards helping the various working interest owners decide whether or not this would be a good candidate for pressure maintenance.

Q. Do you have anything further to say about this, Mr. Cobb?

A. No.

MR. BRUCE: Pass the witness.

EXAMINATION

BY MR. CARR:

Q. Mr. Cobb, have you examined the actual pressure data on the field?

A. I have only looked at the pressure summaries. I have not looked at the pressure buildup test itself.

Q. Are these wells in radial flow in your opinion?

A. I don't know. I just have not looked at the data.

MR. CARR: That's all I need to know. Thank you.

EXAMINER STOGNER: Are there any other questions of this witness?

You may be excused.

Do you wish to recall anybody else?

MR. BRUCE: No, sir.

EXAMINER STOGNER: Mr. Carr?

MR. CARR: I don't think we'll call anyone. I may recall some other case in closing.

EXAMINER STOGNER: Ready for closing

arguments. Mr. Carr, I'll allow you to go first. Mr. Bruce, you may follow up.

MR. CARR: Mr. Stogner, about two-and-a-half years ago, Presidio developed the north half of section -- of the subject section with their No. 9 well. And now they're back seeking a second well. Yates opposes it. It's very simple. We think the well is unnecessary.

We think the well is unnecessary and inappropriate because of the large drainage areas we see because of pressure interference in this reservoir, even pressure interference from the Presidio wells.

We think the OCD shouldn't approve this application. This is an application for an unorthodox well location and simultaneous dedication. And we think what it in fact is is an effort to change the pool rules, at least to start down that road, because of wells on the fringe or the flank of the formation that may not be performing as well as other wells in the pool.

But in addition to your just not -- our opinion that it's inappropriate for you to change it, I submit to you you really can't, because

when you make your decision, you're really going to be bound by two things, the record in this case and the legal framework within which that decision must be made.

The legal framework within which that decision must be made includes the Division's memorandum dated August 3, 1990. Part of that memorandum, citing an earlier memo from the Division reads: "Applications for additional wells on existing proration units will be approved only on the understanding that upon completion of the well the operator shall elect which well will be produced and which will be abandoned."

It goes on to say: "Application to produce both wells will be approved upon compelling evidence that the applicant's correlative rights will be impaired unless both wells are produced."

In this case there is nothing in the record that says Presidio's correlative rights will be impaired. That's what the requirement is.

Their geological witness comes before you and talks about the reservoir. Their

engineering witness comes before you. And neither one of them can tell you from a geological point of view or from an engineering point of view that their rights will be impaired. They say there may be additional zones that could be picked up. Their engineering witness indicated that if you produce one, shut it in for a month while you produce the other, and rock back and forth, that you get there.

They've talked about not impairing the rights of others, but they have never met the requirement of this rule. And there is nothing in this record that would support an order simultaneously dedicating these wells.

The best you can do on this record and in the legal framework within which you must operate is to let them drill it and then order them to plug one or the other. And, simply, that is an unnecessary and wasteful practice.

I would request that the memorandum of the Division dated August 3, 1990, be incorporated into the record. And that concludes our presentation.

EXAMINER STOGNER: So it will be.

Mr. Bruce.

MR. BRUCE: Mr. Examiner, we're dealing here with a depletion-drive gas reservoir which produces substantial amounts of condensate. The unique feature of this reservoir, as pointed out by the witnesses, is a constant GOR of about 3100.

The volumetrics presented by Mr. Wolfarth show that in the No. 10 well, the infill well, will recover more than 300,000 barrels of condensate and approximately 2 Bcf of gas in the northwest quarter of Section 1.

There's been much discussion about the alleged pressure decrease in the pool from 4800 to 3300. As Presidio has stated, we do not believe that's accurate for two reasons: Number one, the dew point is greater than 4500 PSI. And if the actual pressures were 3300, you would expect a dramatic or substantial increase in the GOR in the pool. This has not happened.

The second reason is the low permeability. We believe that the fractures and the permeability trending southwest to northeast result in the low apparent pressures. However, because the vast bulk of the hydrocarbons are in the matrix, whose pressure is undoubtedly much

higher than 3300, there will be no harm by completing the infill well.

Therefore, Presidio believes it needs the No. 10 well, the infill well, to adequately drain the northwest quarter of Section 1. Furthermore, the No. 10 well will drain additional pay which is not being drained by its immediate offsets, which are its own two wells, the No. 9 and No. 8 wells.

Failure to drill the infill well will cause waste by leaving in the ground economically recoverable reserves.

Now, getting into correlative rights, correlative rights are just a subpart of waste. If there is waste, then Presidio's correlative rights are obviously impaired.

As we've stated, there is certainly no effect on the offsets to the north and west and to the northwest. In fact, the No. 10 well, if it's successful, will prove up the southwest quarter of Section 36.

In addition, the No. 10 well conforms to the practical 160-acre spacing pattern immediately to the south of the proposed well. And this is consistent with other Strawn pools in

the area, which are spaced on 42 and 160 acres. And as the Yates' witness testified, there is really little fear of drainage of any of Yates' offsetting acreage.

One thing I'd point out about this infill drilling, although it's not totally analogous, this is kind of what Yates and Conoco sought in the north and south Dagger Draw Upper Penn Pool early this year. They got permission for infill drilling and increased allowables in order to drain their reserves.

We believe that Presidio has shown the compelling evidence necessary for the Division to grant this application, and we would urge you to do so. Thank you.

EXAMINER STOGNER: Thank you.

Does anybody else have anything further?

I'm going to ask that both of you submit me a rough draft order.

MR. BRUCE: By what date?

EXAMINER STOGNER: It's up to you two because the holidays are coming up. You all give me a date.

MR. BRUCE: Bill can do it by the 24th,

and I'll do it by the --

MR. CARR: He wrote me a very nasty letter in another matter that's going to keep me employed on the 24th.

I will file my proposed order on the 24th if you will make him do the same.

EXAMINER STOGNER: How about Friday, the 27th?

MR. CARR: That would be fine.

MR. BRUCE: That would be fine.

EXAMINER STOGNER: Friday the 27th. Thank you, gentlemen. I'll take this case under advisement.

And at this time we're going to recess until 9:00 o'clock in the morning, in which we will reconvene in the Albuquerque District Office of the Department of Interior, Bureau of Land Management, located in Albuquerque, New Mexico, at 435 Montano Road, Northeast, to hear the four cases that deal with packed formations.

(The proceedings were concluded.)

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10416, heard by me on 19 December 1991.

Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL DECEMBER 30, 1991.

Debbie Vestal

DEBBIE VESTAL, RPR
NEW MEXICO CSR NO. 3