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 YATES PETROLEUM CORPORATION

CASE NO. 10,981

JUL - 8 1994

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

May 26, 1994

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on Thursday, May 26, 1994, at Morgan Hall, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

May 26, 1994
Examiner Hearing
CASE NO. 10,981

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A P P E A R A N C E S

FOR THE DIVISION:

RAND L. CARROLL
Attorney at Law
Legal Counsel to the Division
State Land Office Building
Santa Fe, New Mexico 87504

FOR THE APPLICANT:

CAMPBELL, CARR, BERGE & SHERIDAN, P.A.
Suite 1 - 110 N. Guadalupe
P.O. Box 2208
Santa Fe, New Mexico 87504-2208
By: WILLIAM F. CARR

* * *

WHEREUPON, the following proceedings were had at 10:13 a.m.:

EXAMINER CATANACH: At this time we'll call Case 10,981.

MR. CARROLL: Application of Yates Petroleum Corporation to amend Division Order No. R-9976 to expand its pilot gas enhanced recovery project within portions of the Pecos Slope-Abo Gas Pool, Chaves County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr, Berge and Sheridan.

I represent Yates Petroleum Corporation in this case, and we have three witnesses.

EXAMINER CATANACH: Any additional appearances?

Will the three witnesses please stand to be sworn in?

(Thereupon, the witnesses were sworn.)

MECCA MAURITSEN,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. Mecca Mauritsen.

Q. And where do you reside?

A. Artesia, New Mexico.

Q. By whom are you employed and in what capacity?

A. I'm employed with Yates Petroleum Corporation as a landman.

Q. Ms. Mauritsen, have you previously testified before this Division?

A. Yes.

Q. At the time of that prior testimony were your credentials as an expert in petroleum land matters accepted and made a matter of record?

A. Yes.

Q. Are you familiar with the Application filed on behalf of Yates Petroleum Corporation in this case?

A. Yes, I am.

Q. And are you familiar with the status of the lands in the Pecos Slope-Abo Gas Pool?

A. Yes.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Ms. Mauritsen, initially would you summarize for Mr. Catanach what Yates Petroleum Corporation seeks with this Application?

A. We're seeking expansion of our gas enhanced recovery project in the Pecos Slope-Abo Pool in Townships 5, 6 and 7 South, Ranges 25 and 26 East, for the drilling of 20 wells to further test the Abo formation as a second wells on the 160-acre spacing units.

We're wishing to gather data on the pool and determine if additional wells -- if additional development is necessary in the pool to efficiently and effectively drain this portion of the Abo formation.

We're also seeking simultaneous dedication of wells on each proration unit and authorization to produce each well in the project area for a temporary period at unrestricted rates for the remainder of the originally approved two-year test period.

Q. Now, Ms. Mauritsen, this case, the first part of this -- The first case involving this pilot project was first heard in August of last year, was it not?

A. Yes, sir.

Q. And as a result of that hearing, authority was granted for six wells in the Pecos Slope-Abo Gas Pool?

A. Yes, sir, it was.

Q. And authority was granted to produce those wells at unrestricted rates and also simultaneously dedicate those wells with existing wells on the proration unit?

A. Yes, sir, it was.

Q. What does Yates hope to demonstrate with this pilot project?

A. There are a thousand wells on 160-acre unit pools in this pool. There are 200 cases, we believe, where the existing well is not draining the unit.

Our initial data from the six project wells was encouraging but not conclusive. We feel we need to drill additional wells throughout a more representative area of the pool to provide the Division with more meaningful conclusions in August of 1995. Therefore we have chosen 20 spacing units where we feel there's significant undrained reservoir left.

Q. Now, August, 1995, is the time when pursuant to the original order Yates is to report back to the Division on the results of this pilot project?

A. Yes, sir.

Q. How were the drilling locations that we're seeking approval of today, how were those locations actually selected?

A. Okay, there's three criteria.

The location must have good sand thickness on our geologic maps, the location must be outside the calculated drainage areas of existing wells, and the location must be between an on-trend of good cumulative production.

And all of these considerations will be reviewed

by our geological and engineering witnesses.

There were some unorthodox locations, but we attempted to encroach only on Yates-operated tracts in those cases.

Q. If this Application is approved and these wells drilled, is it Yates' hope that additional data will be obtained from which it can be determined if in fact fieldwide rules should be established that permit for additional drilling --

A. Yes.

Q. -- fieldwide?

A. Yes, sir.

Q. Let's go to what has been marked for identification as Yates Petroleum Corporation Exhibit Number 1. Would you identify that for the Examiner and review it, please?

A. Yes, sir, it's a lease map of the original project area and our expansion area. The Yates acreage is shaded in yellow, and each of the subject proration units is outlined.

The green outlines in Township 6 South, 25 East, were our original six wells.

The red outlines are the new 20 proposed wells.

The existing wells are in red dots, the new wells are blue, and all the offset operators are shown on the

lease map.

Q. Now, what is the area that you're asking be included within the proposed pilot project?

A. The project area will be limited just to the 160-acre tracts as outlined. It's not a continuous project.

Q. And that's how the first phase of this pilot project, was approved?

A. Yes, sir.

Q. Let's go now to Exhibit Number 2. Would you identify that for the Examiner?

A. This is just a table showing the well names of the new 20 wells, their spacing units, their section, township and range, and their location by footages.

Q. Now, are each of the wells that are identified on Exhibit 2 either at standard locations or unorthodox locations which only encroach on Yates-operated spacing units?

A. They all are except the very last one which is the Catterson SS Federal Number 7. It encroaches on a tract operated by Merit Energy Company. It was moved for topographical reasons and Merit has waived objection to this location.

Q. Is the purpose of this Application simply to enable Yates to produce these particular tracts at unrestricted rates?

A. No, our objective is to determine if the pool rules should be changed to permit operators to drill additional wells in part or all of this pool.

Q. Is Exhibit Number 3 an affidavit confirming that notice has been provided in accordance with Division rules?

A. Yes, sir.

Q. To whom has notice been given?

A. It's provided to all operators in the Pecos Slope-Abo Pool and all operators of an Abo well within one mile of the pool.

Q. And what was the source of the names of these operators?

A. That was provided to us by the Oil Conservation Division.

Q. And you have indicated Yates will also call geological and engineering witnesses to review the technical portions of this case?

A. Yes, sir.

Q. Were Exhibits 1 through 3 either prepared by you or compiled at your direction?

A. Yes.

MR. CARR: At this time, Mr. Catanach, we move the admission of Yates Petroleum Corporation Exhibits 1 through 3.

EXAMINER CATANACH: Exhibits 1 through 3 will be

admitted as evidence.

MR. CARR: And that concludes my direct examination of Mecca Mauritsen.

EXAMINATION

BY EXAMINER CATANACH:

Q. Ms. Mauritsen did you say, did you testify that some of these wells are located at unorthodox locations?

A. Yes, some are unorthodox, yes, sir.

Q. How does Yates propose to get the approval for the unorthodox locations?

A. We will have to come before another hearing to do that, sir.

Q. Ms. Mauritsen, the acreage in yellow is 100 percent Yates acreage?

A. No, sir, it's either -- It's acreage Yates has an interest in or operates.

Q. How does Yates handle the situation where you have partners in a well? Do you seek to get their approval to drill?

A. We have already sent AFEs out to all our partners, and at this time 15 of the 20 are signed up a hundred percent, and we have approximately another week left in our 30-day notice, so not everyone has responded at this time.

Q. Is all of this acreage that's not a hundred

percent Yates, is that all subject to operating agreements?

A. Yes, sir.

Q. Have you had any objection from any of your partners about drilling a second well on a proration unit?

A. Not at this time. We've had some inquiries, but we've had no objection at this time.

Q. The portion of your testimony concerning your request to produce at unrestricted rates, that is for what period of time?

A. Until the August, 1995, period that was allowed us under the last hearing. There was a two-year period given to us to do that on the first six.

Q. You testified that there may be possibly 200 cases where infill drilling may be appropriate in this pool?

A. Yes, sir.

EXAMINER CATANACH: That's all the questions I have of the witness at this point.

MR. CARR: At this time we call Leslie McKiever.

LESLIE McKIEVER,

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

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your full name and place of

residence?

A. Yes, my name is Leslie McKiever. I reside in Monticello, Arkansas.

Q. How do you spell your last name?

A. M-c-K-i-e-v-e-r.

Q. By whom are you employed?

A. I'm employed by Yates Petroleum Corporation of Artesia, New Mexico.

Q. And what is your current position with Yates Petroleum Corporation?

A. I am their southern division geologist.

Q. Have you previously testified before this Division and had your credentials as a petroleum geologist accepted and made a matter of record?

A. Yes, sir, they were.

Q. Have you been qualified an expert geologist before?

A. Yes, sir.

Q. Are you familiar with the Application filed on behalf of Yates Petroleum Corporation in this case?

A. Yes, I am.

Q. Have you made a geologic study of the portions of the Pecos Slope-Abo Gas Pool which is the subject of this hearing?

A. Yes, sir, I have.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Initially, I think it might be helpful if you could briefly describe the general characteristics of the Abo formation in this area.

A. The Abo formation in the Pecos Slope field area represents the distal end of a fluvial clastic wedge deposited on the lower reaches of a meandering channel system.

The multi-channel patterns are highly sinuous and are often lenticular in nature, producing sandstones, mostly channel point bar deposits, are very fine grain to silty in texture, with porosities averaging 12 to 14 percent. Permeability is low, averaging .03 to .05 millidarcies.

Q. Generally what is the current status of the development of this pool?

A. The Pecos Slope field is developed on 160 acres, covers over 700 square miles. In excess of 1000 wells have been drilled, with over 900 of those wells being completed as gas producers.

Q. What have you attempted to determine with your initial geologic study?

A. Yates is seeking to drill a second producing gas

well on 20 specific 160-acre spacing units in hopes of finding significant amounts of undrained reservoir, that is, incremental reserves that would otherwise not be recovered.

In this effort, the geological scope has included partitioning the Abo and the uniform and detailed sequences that can be correlated consistently fieldwide and mapping the sand packages within these sequences individually to determine optimum areas of sand thickness, one of the three criteria in choosing other proposed locations.

Other geological input has consisted of mapping cumulative production from the field. Another tool to determine the second-develop criteria, the location should be between or on trend with significant cumulative gas production.

My testimony will involve reviewing the geological results of the six initial infill wells by the method of cross-sections and introducing both cross-sections and maps as evidence for the proposed second infill phase.

Q. Could you go to what has been marked for identification as Yates Exhibit Number 4 and identify this for the Examiner?

A. Exhibit 4 is a map that highlights in red the locations of the six wells drilled pursuant to Order Number

R-9976.

Labeled in green are the line of cross-sections that were introduced at the August 12th, 1993, hearing as part of the original application submitted by Yates.

The cross-sections have been revised to include the actual drilled well logs, and appropriate geological revisions have been made.

Q. Okay, let's go to Yates Exhibit Number 5, the original cross-section as modified, A-A'.

A. Exhibit 5 shows the South Alkali "LK" Federal Number 5, drilled on the same 160 spacing unit as the South Alkali "LK" Federal Number 2, a well with a cumulative gas production of over 1.5 BCF.

As illustrated, the South Alkali "LK" Number 5 encountered significant productive channel sandstones not occurring in the well on the same proration unit.

This well, the most successful well of the original pilot program, demonstrates the need to drill additional wells to recover reserves that otherwise would not be produced.

Q. All right, let's go to Exhibit 6, cross-section C-C'.

A. Exhibit 6 illustrates the YPC Hobbs Federal Number 3, a well location chosen to maximize the thickness of one particular upper sand and to achieve a more optimum

position in this channel in respect to the original well drilled in this proration unit.

Geologically, this well was successful, but the actual production performance has been poor. The well is an example of one particular instance where the infill well is not economically viable, at least under today's current gas market.

The explanation for this poor result may be at least in part explained by the effects of drainage by offset wells on other spacing units. Mr. Stallings will address this in more detail, in later engineering testimony.

This unique case, as much as any other, illustrates the uncertainties of infill drilling that can only be addressed by the drilling of additional pilot program, rather than proceed prematurely with permanent fieldwide rule change.

Q. This well was, however, successful from a geological point of view?

A. From a geological point, it was.

Q. All right. Let's go to Exhibit Number 7, cross-section E-E'. Would you review that for Mr. Catanach?

A. Exhibit 7 shows the Cleo "ANC" Com. Number 1.

This well represents the single geological failure of the initial pilot project and clearly points out

the inherent risk involved with predicting the geometry of meandering fluvial channels.

Even though this was an area with multiple chances for pay sands, this particular wellbore failed to find adequate sand thickness.

This well underscores the geological risk, and unfortunately poor results of this nature will continue to occur occasionally, even with infill development.

Q. All right. Let's go now to Exhibit 8, cross-section F-F'.

A. Exhibit 8 shows the results of the Kilgore "SO" Number 3 and represents an example wherein geology and engineering predictions were right on target.

This well may ultimately recovery more gas reserves than the original well drilled on this particular 160-acre spacing unit, and clearly it illustrates new incremental gas reserves can be found in the Pecos Slope field.

Q. And finally cross-section G-G', Yates Exhibit Number 9.

A. Exhibit 9 denotes the results of the final two gas completions of the initial pilot in Township 6 South, Range 25 East.

The YPC Cottonwood Federal 3 again illustrates we achieve our anticipated goals. Pay zones somewhat

stratigraphically different from the original well, the YPC Cottonwood Number 2, were encountered. Performance predictions of this well is again expected to exceed the initial well.

The last of the six wells to be shown, the Sacra "SA" Com. Number 11, were perceived to be the most geological risk well to be drilled. It did not find a much hoped for lower channel sand, but did achieve adequate sand thickness to be deemed a commercial success. The producer's anticipated ultimate gas recovery is expected to exceed three of the existing wells in this section.

Q. Now, Ms. McKiever, what is the significance of this new information that's been obtained in the first part of this pilot project?

A. Well, the data that we acquired from the six wells presented here confirms our original premise that there are significant variations in the channel sandstone reservoirs.

Due to geological considerations, the very depositional nature of fluvial meandering channel systems and extremely low permeability of the sandstones deposited show areas that are not being effectively drained on 160-acre spacing in Township 6 South, Range 25 East, the very heart of the Pecos Slope field.

The results of this infill pilot program are

extremely encouraging. New incremental reserves will now be effectively recovered.

However, the program is not completely conclusive. There is not enough available data at this time to be derived from the limited scope of these six wells to prudently determine and establish permanent poolwide rules.

Q. The data you have, in fact, the new data is from one township?

A. Yes, it is.

Q. Let's go to Yates Exhibit Number 10. Would you identify that for Mr. Catanach?

A. Yates Exhibit 10 is a location map that shows the recommended expansion area submitted for the second phase of infill drilling and the 20 specific locations proposed in this program. They are shown in red circles, encased in blue rectangles.

Lines of cross-sections prepared to graphically illustrate the anticipated results are shown in green. They are labeled in alphabetical order from A-A' through G-G'.

Q. Let's go now, and I would ask you to initially identify Exhibits 11 through 17, and together explain these to the Examiner.

A. Okay. Exhibits 11 through 17 are cross-sections

constructed through each of the 20 proposed locations.

If it would please the Commission, for brevity I would like to discuss in detail Exhibit 14, labeled D-D', which crosses six of the proposed locations. It is representative of and consistent with all of the cross-sections submitted here today.

Q. Let's go to Exhibit 14.

A. Exhibit 14, cross-section D-D', runs the length of Township 7 South, Range 25 East, and, as mentioned previously, crosses six of the proposed locations.

In the initial hearing last August we had initially subdivided the Abo producing intervals into three separate sequences of sedimentation, with multiple channels occurring within those intervals.

To provide more detailed and uniform mapping techniques, we have since divided the Abo producing zones into five sedimentary packages, again with multiple channel sequences occurring within the five divisions. They are labeled, from shallower to deeper, Zone A, B, C Upper, C Lower, and D. And as you can see, there are producing intervals within each of these divisions.

Each of the six locations fit within the first criteria that each location must have not only adequate but good sand thickness.

The cross-sections, as a whole, provide the

proper and consistent framework for uniform and detailed geological mapping fieldwide and also provide a good baseline to evaluate the actual results of this proposed pilot project against the anticipated results.

Q. Let's go now to Yates Exhibits 18 through 22. Can you identify those?

A. Yates Exhibits 18 through 22 are a series of isopach maps showing the pay sands' thicknesses within each individual interval, as previously defined with the cross-sections labeled Exhibit 11 through 17. They are labeled Zone A, Zone B, Zone C, Zone Lower C, and Zone D.

The format of each map is similar with each of the 20 locations marked by white well spots surrounded by a blue rectangle.

Each of the maps is contoured on ten-foot intervals, with Map D, Exhibit 22, being the only exception. It is contoured in five-feet increments.

The colors grading from yellow to orange highlight the thickest intervals. All of the proposed locations are located to maximize the sand thickness in more than one selected sand package.

Q. Let's go now to Exhibit Number 23, your cumulative production map. Would you refer to that exhibit and review the information on it for Mr. Catanach?

A. Yates Exhibit 23 is a cumulative production map

dated December 31st, 1993. Again, the proposed locations are marked with white well spots in a blue rectangle.

This map shows the areas that have greater than .5 BCF cumulative gas production.

The contours drawn in increments of a half a BCF grade from yellow to orange. The orange represents areas that wells have cumulative gas productions above or 1.5 BCF. A number of wells in this field have produced in excess of 2 BCF.

The proposed well locations are situated in such a manner as to be adjacent to and on trend with pre-existing gas wells with substantial production. This was the second criteria in choosing locations for the pilot.

Please note that all locations fall within areas mapped in excess of .5 BCF. The exception to this rule is the Papalote OI State Com. Number 5. This was not a change or an omission of our stated criteria, but rather a problem in the final drafting of this map.

Q. Okay. Anything further with Exhibit 23?

A. No.

Q. Could you summarize for the Examiner what you believe your geologic study establishes about the Pecos Slope-Abo Gas Pool?

A. This study represents a detailed, if not rather exhaustive, geological effort to ensure and substantiate

that each of the proposed wells will encounter not only adequate but good sand thickness, and the wells offset are on trend with good Abo producing gas wells.

This geological effort provides a basis for and a background for the engineering testimony to follow.

Q. These are the geological considerations for placing each of these wells at the exact location that you're proposing?

A. Yes, they are.

Q. In your professional opinion, is it the logical next step should be taken to expand the pilot project as you've recommended, and thereby move toward the development of the fieldwide rules?

A. Based on my 13 years of experience working within the Pecos Slope, this proposed 20-well expansion program is the prudent and logical next step to acquire further data and evaluate that data to provide a solid basis for sound decision-making as to the proper future of infill drilling practices. I believe that this program will prevent waste and does not harm but does indeed protect correlative rights.

Q. Ms. McKiever, were Exhibits 4 through 23 prepared by you?

A. Yes, they were.

MR. CARR: At this time, Mr. Catanach, we move

the admission of Yates Petroleum Corporation Exhibits 4 through 23.

EXAMINER CATANACH: Exhibits 4 through 23 will be admitted as evidence.

MR. CARR: That concludes my direct examination of this witness.

EXAMINATION

BY EXAMINER CATANACH:

Q. Ms. McKiever, of the six wells that have been drilled, how many did you say were geologic successes?

A. Five of the six wells.

Q. How do you define that as being successful geologically?

A. That I predicted adequate sand thickness that the well would produce at commercial rates.

Q. Geologically, tell me how the portion of the pool that you plan to test with the new 20 wells, tell me how that differs geologically with the portion of the pool that you've already tested.

A. Geologically, it is not that much different.

The whole area is past fluvial channel sandstones, and there are multiple pays in these fluvial channel sandstones.

What we don't know is whether that Township 6 South, Range 25 East, is anomalous in respects to drainage.

Geologically, it is not exceptional.

Q. You mentioned that -- I believe on the first well, you mentioned the first well of the six, you encountered sands that weren't present in the existing well. Was that the only time that situation arose?

A. There were variations of that throughout the other wells, but that was probably the most significant illustration of that particular point.

Q. Generally speaking, you probably encountered sands that were already -- that were present in the existing well?

A. You would find sands that were present in the existing well and maybe one or two additional sands that weren't present in the additional well.

Q. Okay. These new proposed locations were chosen basically on the same criteria that the first six were chosen on?

A. Yes, they were.

Q. Ms. McKiever, do you feel that the 20 new wells will give you sufficient geologic information with which to make a decision on the infill drilling of this pool?

A. I believe they will.

They will definitely come a lot closer to making those decisions than, you know, limiting those decisions to the original six wells.

Q. Geologically speaking, do you think that just based on the information you've already obtained that you cannot make a good judgment at this time?

A. I think that we're still going to find surprises as to the actual size and shape and geometry of these channel sandstones. I would rather not have any surprises in these next 20 wells, but I can assure you I will have one or two.

Q. If the geology isn't going to change all that much within the pool, what additional information, geologically speaking, might you gather to help you make a decision?

A. Well, I think geologically we understand the nature of the depositional environment, and it is still rather difficult to map on individual channel sandstones. We lump them together in the five intervals.

And ultimately I think that we can provide a lot more detailed mapping and delineate particular channels, locations of channels that may not be producing in a nearby well or from the well on the same producing -- proration unit.

EXAMINER CATANACH: I have no further questions, Mr. Carr.

MR. CARR: Mr. Catanach, at this time we call Darrick Stallings.

DARRICK STALLINGS,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. Darrick Stallings.

Q. Where do you reside?

A. In Artesia, New Mexico.

Q. By whom are you employed and in what capacity?

A. I'm employed by Yates Petroleum Corporation as a petroleum engineer.

Q. Mr. Stallings, have you previously testified before this Division and had your credentials as an expert witness in petroleum engineering accepted and made a matter of record?

A. Yes.

Q. In fact, you were the engineering witness who testified in the August, 1993, hearing concerning the initial phase of this pilot project?

A. That's correct.

Q. Are you familiar with the Application filed in this case on behalf of Yates Petroleum Corporation?

A. Yes.

Q. Have you made an engineering study of the portion

of the Pecos Slope-Abo Gas Pool involved in this case?

A. Yes, I have.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Mr. Stallings, initially could you review for the Examiner how the initial six wells were selected?

A. Yes, the six wells were selected as a result of our initial phase of our evaluation of infill drilling potential in the Pecos Slope-Abo.

When we began that initial phase of the evaluation, we decided early on to limit the area of our evaluation just because of the size and the number of wells in the entire field.

We chose Township 6 South, 25 East, as our study area for a few reasons, one because that is in the heart of the field and it has some of the best producing wells in the field.

Also, Yates Petroleum operates most of the wells in that township, so that gives us a lot of detailed well information, and we felt like we would minimize the problem of encroaching on other operators.

We had also recently drilled -- At the time we began the study, we had recently drilled several wells in

that township, regular spacing wells which provided us with recent drilling and pressure data.

Q. Could you summarize from an engineering perspective the results that have been obtained to date from the phase-one portion of this pilot project?

A. Yes, we completed drilling the six wells that were approved. Those wells were drilled in November and December of last year, 1993. We measured initial bottomhole pressure in each of those wells, and we now have four to six months, depending on when the well was completed, four to six months of production data from those wells.

The results from those wells have been mixed, as Leslie referred to, but we're encouraged by the results.

Only four of the six wells appear to be economically successful. However, I estimate that those six wells will recover 2.4 BCF of new reserves that would not have been recovered by the original existing wells in that area. We consider that to be very encouraging.

Q. What type data has Yates been attempting to obtain from this pilot project?

A. In addition to the geologic data that was just reviewed, we're primarily gathering initial pressure data in the new wells and, of course, production data and decline characteristics of these wells.

Q. What did your engineering study focus on?

A. I used those two last pieces of data, the pressure data and the production data, to focus on the drainage issue and trying to identify undrained portions of the reservoir.

Q. Now, before we get into the details of your presentation, could you just provide a general estimate of what the expansion portion of this project is going to cost in terms of up-front investment?

A. Yes, sir. We spent just under $1.8 million to drill the six wells late last year. That's an average cost of about $300,000 per well.

Those costs should be representative of the next wells we drill, and therefore 20 wells will cost $6 million.

Q. Now, Mr. Stallings, let's go to the exhibits you've prepared. First let's go to Exhibits 24 through 26, and if you could initially explain what these exhibits are and what they're designed to show.

A. Okay, each of those three exhibits is the same base map of Township 6 South, 25 East, which includes the six pilot wells that we've drilled.

On each of these maps I've summarized a different category of engineering data that we've gathered from these wells, and I'll go over these.

But the first one is the bottomhole production data, Exhibit 25 is the production-rate data, and then Exhibit 26 is the estimated reserves data from these wells and their offset wells.

I'd like to explain how each of these exhibits is organized.

The new well has its well name labeled, and it is shown as a red gas well symbol.

The offset four wells, the four nearest offsets, are shown as green gas well symbols.

And I've outlined the proration unit where the new well lies as a purple box.

Q. Okay, there's posted data on the exhibits?

A. That's correct. And in addition to that, I've posted the data from the new wells in red numbers, and the legend for each map will tell you what the units are in those numbers. The offset well data is posted in green.

I've posted the data specifically for the original well on the proration unit, and then out to the side beside each proration unit I've posted the average value for the four nearest offsets.

Q. Let's go now to just Yates Exhibit Number 24, your bottomhole pressure data. Would you review the information on this exhibit for Mr. Catanach?

A. Yes, sir, this summarizes the bottomhole pressure

data from the new wells, and it also includes current bottomhole pressure data from the existing wells, the nearest offsets.

The initial bottomhole pressure that we measured in the new wells is shown in red in p.s.i. We measure these pressures from a five-day pressure buildup test upon initial completion of each of these wells.

The green numbers shown are the pressures for the offset wells. Those pressures are static pressures that we measured in November of 1993, roughly the same time we were drilling these wells. We had an opportunity to measure those pressures because there had been a fieldwide shut-in of all wells for an extensive period of time, and we felt like the static pressures were valid at that time.

Q. Generally what conclusions have you been able to reach from your review of the information on this exhibit?

A. These pressures will show -- and I'll go through these, but they'll show that in five of the six wells we encountered reservoir pressure significantly higher in the new well than what is the current reservoir pressure in the existing wells.

As I go through these numbers, it will be helpful to recognize that the original reservoir pressure in the pool was 1125 p.s.i.

But what we find is that five of the six wells

again encountered higher reservoir pressure than the offsets, but none of them encountered virgin reservoir pressure. This is an indication of limited communication with the offset wells, and I think that is explained by the geology that Leslie just reviewed.

Again, this reservoir is made up of several sand channels, and in a given well we'll vertically intersect generally more than one of those. I think that some of those channels are in communication with the offset wells, and some of those channels are not. But yet we complete all those channels together, and the pressure that we measured was one pressure, which is actually an aggregate of the individual pressures in those given channels.

The channels that are in communication with the offset wells probably have a lower pressure than what we've measured and shown here. And the channels that are not in communication, we feel have a higher pressure than the aggregate pressure and possibly are even at original pressure.

Q. All right. Let's look at the individual wells, now, if you would, that were included in the first phase of this pilot project, and summarize generally the sort of results you obtained.

A. All right. I think we'll show that, again, these wells -- the pressures indicate that in most cases we

encountered new reserves.

I'd like to go through these well by well, starting at the bottom of the plat down in Section 35.

The Sacra "SA" Com. Number 11 had an initial reservoir pressure of 880 p.s.i. At the same time, the existing well in that proration unit had a pressure of 291 p.s.i., and the average of the four offsetting wells in that section is 309 p.s.i.

The fact that we have almost 900 p.s.i. in the new well compared to 300 p.s.i. in the existing wells is an indication that we have encountered a portion of the reservoir that's not being drained by the original wells, and therefore a significant portion of the reserves that will be produced from this new well will be new reserves.

As we move -- If we could move on up the plat, up into Sections 26 and 24, the next two wells I'd like to discuss, the Cottonwood Federal Number 3 in Section 26, Kilgore "SO" Number 3 in Section 24, have very similar results.

Those two wells came in with approximately 900 p.s.i. reservoir pressure. At the same time, their offsets are on the order of 300 p.s.i. reservoir pressure, again indicating that these wells have encountered portions of the reservoir not being drained by the existing wells and that a portion of the reserves that they're going to

produce will be new, unique reserves.

Up in Section 11 is the Cleo "ANC" Com. Number 1. This is one of the two economically unsuccessful wells that we drilled. It had an initial reservoir pressure of 680 p.s.i., and its offsets had an average reservoir pressure of 219 p.s.i.

I don't think this well was unsuccessful because of the low reservoir pressure. Instead, I think the fact that the new well came in with 700 p.s.i., as compared to roughly 200 p.s.i. in the existing wells, is an indication that again this well encountered a reservoir that was left undrained by the existing wells.

As Leslie discussed, in this case, this well was uneconomic because we encountered inadequate sand thickness for an economic well. I think that in fact this well -- Because the pay quality is poor and thin, this well would be uneconomic even if we would have encountered it at initial virgin reservoir pressure.

Moving up just north there into Section 1, the South Alkali "LK" Number 5 had initial reservoir pressure of 667 p.s.i., and its offsets average 237 p.s.i. This is a similar pressure to the previous well we discussed, the Cleo Number 1. But yet the South Alkali Number 5 encountered much better pay quality and sand thickness. And that well is, in fact, producing as if it's going to be

the best well of these six that we've produced -- that we drilled in this pilot.

The sixth well, the final well over in Section 8, is the Hobbs Federal Number 3. This is the other uneconomic or unsuccessful well that we drilled of the six. It had initial reservoir pressure of 479 p.s.i., compared to its offset wells averaging 249 p.s.i. at this time.

I think this well is basically uneconomic because we drilled into a portion of the reservoir that's being depleted by the offset wells. This well is producing, but I don't think that a very large percentage of the gas it recovers will be unique reserves.

This well points out the drainage risk involved in infill drilling in this field, and it's obviously the kind of well that we hope to avoid drilling in the future.

Q. Let's go now to your production rate data, Exhibit 25. Would you review the information on this exhibit for the Examiner?

A. This exhibit, the symbols are set up just like the previous exhibit. The numbers posted here, in red I've posted two production rates for the new wells. The top number is the daily production rate in MCF per day for the first month that that well was on line. The lower number is the daily production rate at the most current data we have as of April of 1994. For the offset wells, I have

shown their actual daily production in April of 1994.

Overall, this data is consistent with the pressure data that I've just discussed in that the four wells that appear to be economic and appear to be producing significant new reserves, they are producing at much higher rates than the existing wells surrounding them.

The reason that I included two numbers for the new wells, the first month's production rate and the current production rate, is to show an indication of how these wells had declined early in their life. We're watching the characteristic of decline of these wells because we feel like that's going to be a indication of depletion in the drainage area accessed by these new wells.

What I've found is that these wells are declining very similarly to wells in the field that are drilled on regular spacing.

In 1992, we drilled 20 wells in the Pecos Slope-Abo, regular 160-acre locations. Those wells declined 41 percent from their first month's production rate to their third month's production rate. By comparison, five of these six wells have declined an average of 43 percent from their first month to their third month. So I think that's very similar to the way wells on regular spacing are acting.

The exception to that is the South Alkali Number

5 up in Section 1. That well only declined ten percent in its first three months, and again an indication of what a good producing well that well appears to be.

I've seen no cases of steep, abnormally steep declines in these wells, which indicates to me that the drainage areas of these new wells have not been severely depleted by the offset existing wells.

Q. All right. Let's go now and look at individual well performance, if you could briefly review that.

A. Again, starting down in Section 35, the Sacra "SA" Com. Number 11, I'll concentrate on the current producing rate as compared to the offsets.

That well in April produced 230 MCF per day. Its offset wells in that section averaged 23 MCF per day.

In this case, if we assume a per-well economic limit rate of 15 MCF per day, it would follow that the original wells in this section have very few remaining reserves, because they're very near their economic limit rate. Therefore, the reserves that the Sacra Number 11 are going to recover will be mostly new reserves that would not be recovered by the other wells.

Moving up the page, again, grouping the two wells in Sections 24 and 26 together, these wells are producing on the order of 350 MCF per day. At the same time, their offsets are producing around 120 MCF per day. That

significant increase in production from the new wells indicates to us that those wells have again encountered new reserves that won't be drained by the original wells.

Up in Section 11, the Cleo Number 1 again is one of the uneconomic wells that we drilled. That well is producing 51 MCF per day in April, compared to 70 MCF a day in the offset wells. I think that's explained because the pay in that well is much thinner and poorer quality than that in the offsets, and that's why it was such a geologic surprise. But it just does not appear to have the pay quality to produce significant reserves and pay out the well.

The South Alkali Number 5 up in Section 1 is producing 742 MCF per day, compared to a current rate of 110 MCF a day in the offset wells, indicating significant new reserves to be recovered by that well.

And then over in the Section 8, the other unsuccessful well we drilled, the Hobbs Fed Number 3, is producing 39 MCF per day, compared to 52 MCF per day in the four nearest offsets. This well, again, I think, just accessed reserves that were already being drained by the other wells and therefore did not result in a rate greater than the previously existing wells.

Q. All right, let's go now to Yates Exhibit Number 26, the reserve data. Would you review that information?

A. Yes, sir. Again, this map is set up just like the previous two. The numbers that I show here, I show two numbers for the new wells, two reserve numbers.

The top number is total reserves, the entire amount of reserves that we expect to produce through that wellbore. That number has been calculated from decline-curve analysis.

The second number are the unique reserves that we expect to recover.

Q. What are unique reserves?

A. The unique reserves are the portion of the total reserves that would not have been recovered by offset wells. New reserves is another term we use.

For the offset wells, I have shown the remaining reserves in those wells as of January of 1994. Those reserves were calculated from decline-curve analysis consistent with the way the new wells were evaluated.

I'd like to go into a little more detail about the percent unique reserves. Again, the total reserves are based on decline-curve analysis. That's an established method of predicting reserves in the Pecos Slope-Abo field.

We've estimated what percentage of those reserves are unique, based on the pressure data that we encountered, and it's based on the premise that if we encounter virgin pressure in an infill well, 100 percent of the reserves

that well will produce in its life will be new, unique reserves.

Conversely, if we drill a well that is at exactly the same pressure as its offset wells, zero percent of the gas that well produces will be new reserves; it will just be accelerating production of reserves that would have been recovered by the existing wells.

Based on that pressure-to-unique-reserves relationship, the reserves in these six wells range -- our estimate ranges from about 30 percent in the Hobbs 3, which is the lowest pressure that we measured, to 90 percent unique reserves in some of the more successful wells.

The average -- Rather than going through all these numbers, again, you can see the numbers there, Mr. Examiner, the average reserves for the four successful wells, the average unique reserves are 570 million cubic feet. The average for the two unsuccessful wells is about 60 million cubic feet.

Q. Mr. Stallings, how do you characterize the results you've obtained to date in the pilot project?

A. Well, the fact that we've found new reserves, I consider that encouraging. I think that the results are inconclusive to make a fieldwide judgment.

We have shown that at least in this part of the field there are reserves that are remaining that will not

be drained by the existing wells. However, this is the heart of the field, it's a relatively localized area, and I'm just not sure that we have some question as to whether these results can be extrapolated to a fieldwide basis.

That is why that we feel like it would be prudent to drill additional wells to get additional data. I think that if we were to wait two years for the pilot period to expire, basically the only additional data we will gather for these six wells will be their production data. And I think with the mixed results that we've had, we will not be able to make a conclusive and completely informed recommendation, even in two years.

So we would like to proceed with additional drilling to develop -- to gather additional data in a broader area of the field to see if in fact our models and our drainage theories and the -- hold and whether we could find new reserves in a broader area of the field and therefore make a more educated recommendation at the end of the pilot period.

Q. And you're recommending that the pilot period not be extended; you're working with the same two-year period originally approved?

A. That's correct, we see no reason to recommend extending the pilot period.

Q. Let's go to what has been marked Yates Exhibit

27. Could you identify that, please?

A. I call this my drainage map. This map shows the 20 proposed locations as red dots. It shows the existing wells in the area of those proposed wells, and it shows two pieces of information about the existing wells.

The number posted by the well is the estimated ultimate recovery from that well. That gives us another indication of how good that well is, the wells in that area are.

The green circles around each well represent the calculated drainage areas of those wells. Those areas were calculated with the volumetric equation for gas wells in a depletion-drive gas reservoir. I went into detail last August at the original hearing as to how that calculation was done.

But we are able to use this map in conjunction with the geology maps that were presented earlier to identify portions of the reservoir that have been left undrained by the existing wells.

Q. And so each of these wells would be outside existing drainage areas?

A. You can see from where the wells are spotted that that, in fact, is true, that the proposed wells do lie outside the calculated drainage areas of the existing wells.

Q. But also in the area of good producers?

A. That's correct.

Q. All right, let's move to Yates Exhibit Number 28.

A. Okay.

Q. Would you identify this and explain how it differs from the preceding exhibit?

A. Exhibit 28 is another drainage map; it looks very similar to the previous map that I just showed. Again, the prospects are shown in red. The estimated ultimate recovery is posted beside each well -- those are exactly the same numbers as were shown on the previous exhibit -- and the calculated drainage areas around each well are shown as circles.

The difference in this map and the previous map is the method in which the drainage areas were calculated. Whereas the previous map we used just the volumetric equation to estimate drainage areas, we saw a need as a result of the first six wells we drilled and the one unsuccessful well that we drilled that appears to be depleted, that maybe we need to refine our technique of calculating drainage areas.

So another engineer in our company developed a brand-new technique, completely independent of the volumetric technique that was used on the previous map. He did a reservoir simulation of Pecos Slope-Abo wells. He

matched that simulation, he history-matched it with actual data from the field. He was then able to develop a set of tight curves from which he can predict drainage areas for all of the wells in the Pecos Slope-Abo field.

Again, this method does not include a lot of the assumptions that were included in the volumetric calculations, and so it's completely independent.

What I think is significant is, after we went through that effort we find that in most of the cases if you overlay these maps, that the calculated drainage areas agree very closely with each other from the two different techniques.

Again, on the second map with the yellow circles, the proposed wells fall outside the drainage areas of the existing wells.

Q. Mr. Stallings, what does Yates hope to learn from the expansion of this pilot project? Or maybe a better way to state that is, why are these 26 wells' totals needed?

A. Well, we've revised and refined our evaluation techniques. We felt a need to do that as a result of the mixed success that we had in the original six wells. We've reviewed that we're now mapping in five sand packages, rather than three sand packages, which was previously done. We feel like this will give us a more detailed look at the reservoir and better be able to predict geology.

But again, it's just a prediction. Now, we need to test that technique against actual drilling to see how well this prediction tool is.

We've also developed an additional way to estimate drainage areas in the existing wells. We'd like to test that against new wells, the data that we gather from new wells.

We feel like that additional wells are needed to cover a broader, more representative area of the field as a whole. The original pilot, again, was concentrated in the heart of the best producing part of the field. We hesitate to recommend fieldwide changes or make fieldwide decisions based on that localized area.

We feel like that this area covering four additional townships will provide a more -- a better look to make a fieldwide-basis decision.

Q. If this pilot project is expanded as you request, is it your hopes that in August of 1995 you will be able to make recommendations to this Division concerning changes in the rules fieldwide?

A. We fully expect to be able to do that, yes, sir.

Q. Mr. Stallings, what does Yates project or anticipate to be the additional reserves that can be recovered if this effort is in fact successful and infill drilling occurs in the pool?

A. I think Mecca mentioned earlier that we think that on Yates' acreage alone there may be as many as 200 proration units that would benefit economically from an additional well.

I think that the average reserves from those wells may be on the order of half a BCF per well, that that results in 100 BCF of remaining reserves in the field, and we've just looked at our acreage portion of the field.

Q. And are these reserves reserves that otherwise would not be recovered?

A. I think that's correct. I think that that would be our incentive in doing that, would be if we feel like there's reserves that will not be recovered by these --

Q. And this program, therefore, would present waste to that magnitude?

A. That's correct.

Q. Will correlative rights also be protected if this Application is granted?

A. Yes.

Q. Were Exhibits 24 through 28 prepared by you?

A. Yes, sir.

MR. CARR: Mr. Catanach, at this time we move the admission of Yates Exhibits 24 through 28.

EXAMINER CATANACH: Exhibits 24 through 28 will be admitted as evidence.

MR. CARR: That concludes my direct examination of Mr. Stallings.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Stallings, the geologist has testified there's really not much geologic difference in the field, and yet you emphasize the need to expand into a broader area. Can you explain that reasoning?

A. My reasoning for that is, there may not be a difference in the depositional environment or the other geologic features as you spread across the field. There certainly is a difference in the producing characteristics of the wells in general. There are sweet spots in the field.

The single best part of the field is where the original pilot took place, and I think that we've shown that there is remaining gas in that area. I'm just not sure that you'd ever believe me if I came back and told you that there's remaining gas over the whole field, just because there's remaining gas in the best part of the field, based on production data.

Q. What kind of different producing characteristics are you talking about?

A. Well, those are summarized, and it's -- That is a very general statement, but it's based on cumulative

production of wells, and those are posted on the last two maps that we looked at, actual ultimate recoveries of those wells.

They vary widely, granted, from well to well even in a given area. But when we look very closely at the data, we find that a high concentration of very good wells is in Township 6 South, 25 East, and the wells are more mixed, as you get away from that in all directions, as far as the economics, the ultimate recovery of those wells.

I guess it's also of concern to me that even in the heart of the field, we had mixed success. I would certainly hope that in the future for an infill program a two-thirds success rate -- I don't know if that's acceptable for a fieldwide program, if it's good.

The economics for these six wells in aggregate are marginally attractive, when you throw in the two uneconomic wells.

I think that before we and other operators will be encouraged to do a significant amount of infill drilling, we'd need to be able to show better success and better overall economics than we could show you as a result of these six wells.

Q. Do you have a number as to what kind of unique reserves you would drill a well to recover?

A. Yes, a rule of thumb we use is, the minimum

reserves, and therefore the minimum unique reserves, required to make a well economic is about 400 million cubic feet.

Our target for infill wells, our management has said that the minimum target that we want to drill for is 500 million cubic feet. So that will provide us a profitable well, with 400 million being the minimum economic well we could drill. And I guess that's obviously based on current gas prices.

Q. Why 20 additional wells, when you originally only asked for six?

A. Twenty is not a magic number. I don't know that 20 is better than 25. We just feel that we need some additional wells over a broader area of the field. Twenty is a number that our management was willing to spend money on. We're willing to spend the $6 million to gather the data from these wells.

Q. The area that you've got on Exhibit Number 27 or 28, what portion of the whole field does that area represent?

A. I wished I had a map of the field limits to tell you. I can tell you in rough terms that the south -- the field extends south roughly to Range 28 -- no, Township 8, excuse me. It goes as far north as Township 4. Township 25 is roughly the western edge of the field, and Township

26 is roughly the eastern edge of the field.

So we've shown the east and west limits, but we've not shown the north and south limits on this map. Is that a fair a general statement? I think that's --

MS. McKIEVER: Twenty-four and 27.

THE WITNESS: Twenty-four and 27.

Q. (By Examiner Catanach) Is there a reason why you're not expanding this pilot into other areas of the pool besides -- I mean to even get a broader --

A. Yeah --

Q. -- what might --

A. The reason, quite frankly, is because we just -- we didn't do the work and evaluate those areas.

There are a thousand wells out here, and the detail work that we've done, we felt like this was a representative area for a pilot, and we're saving the fieldwide study. We felt like that time would be most appropriately spent if the time comes when fieldwide rules are adopted.

Q. What kind of additional engineering evidence do you hope to gather to substantiate your -- or to support your position?

A. More of the same. The pressure -- The initial pressure and the production data, again, are the primary engineering tools to evaluate depletion out here. So we'll

use a similar analysis technique to the one I've described. Again, we just feel like we want it over a broader, more representative area of the field.

EXAMINER CATANACH: I have nothing further, Mr. Carr.

MR. CARR: Mr. Catanach, that concludes our presentation in this case.

EXAMINER CATANACH: Okay. There being nothing further in this case, Case 10,981 will be taken under advisement.

(Thereupon, these proceedings were concluded at 11:25 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10981, heard by me on May 26 1994.

David R. Catanach, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL June 7th, 1994.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1994