STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 11,728

APPLICATION OF THOMPSON ENGINEERING AND PRODUCTION COMPANY FOR AN UNORTHODOX COAL GAS WELL LOCATION, SAN JUAN COUNTY, NEW MEXICO

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

March 20th, 1997

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, March 20th, 1997, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

March 20th, 1997
Examiner Hearing
CASE NO. 11,728

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E X H I B I T S

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* * *

A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 1:10 p.m.:

EXAMINER CATANACH: Call the hearing back to order at this time, and we'll call Case 11,728.

MR. CARROLL: Application of Thompson Engineering and Production Company for an unorthodox coal gas well location, San Juan County, New Mexico.

EXAMINER CATANACH: Are there any 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. We represent Thompson Engineering and Production Company.

I have two witnesses.

EXAMINER CATANACH: Additional appearances?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the opponent, Texakoma Oil and Gas Corporation.

I have one witness.

EXAMINER CATANACH: Any additional appearances?

Will the witnesses please stand to be sworn in at this time?

(Thereupon, the witnesses were sworn.)

MR. CARR: At this time we call Mr. Emmendorfer.

ALAN P. EMMENDORFER,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. My name is Alan P. Emmendorfer.

Q. Would you spell your last name?

A. E-m-m-e-n-d-o-r-f-e-r.

Q. Where do you reside?

A. Farmington, New Mexico.

Q. By whom are you employed?

A. Coleman Oil and Gas at Farmington, New Mexico.

Q. And what is your position with Coleman Oil and Gas?

A. Petroleum geologist.

Q. Could you explain to Mr. Catanach what is the relationship between Coleman Oil and Gas and Thompson Engineering and Production Company?

A. Yes, Thompson Engineering and Production Company is the operator of the proposed Steward Com Number 1. Coleman Oil and Gas is the largest working interest owner within the well.

Q. And you are the geologist working on this project?

A. Yes, I am.

Q. Have you previously testified before the Oil Conservation Division?

A. Yes, I have.

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

A. Yes, they were.

Q. Are you familiar with the Application filed in this case on behalf of Thompson Engineering Company?

A. Yes.

Q. Have you worked in this area in the past, Mr. Emmendorfer?

A. Yes, before I went to work for Coleman Oil and Gas I was a consulting petroleum geologist, and one of the jobs that I did was wellsite geology work, and I was the wellsite geologist for four of the five Texakoma wells that are in this area.

Q. And these are the wells that offset the proposed location?

A. Yes, they are.

Q. Have you made a geological study of the area which is the subject of this Application?

A. Yes, I have.

Q. And are you prepared to share the results of that

study with Mr. Catanach?

A. Yes.

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

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Would you briefly state what Thompson Engineering and Production Company seeks with this Application?

A. Okay, with this Application, Mr. Examiner, Thompson Engineering and Production Company seeks approval of an off-pattern coal gas well location for our proposed Steward Com Well Number 1. It is to be drilled in the Basin Fruitland Coal Gas Pool at a location of 790 feet from the south and east lines of Section 28, Township 32 North, Range 13 West, San Juan County, New Mexico. The east half of Section 28 is to be dedicated to this well.

Q. Mr. Emmendorfer, what are the spacing rules which govern development of the Basin-Fruitland Coal Gas Pool?

A. Okay, currently the Basin-Fruitland Coal Gas Pool is spaced on 320-acre spacing, 790-foot setbacks from the lease line or the proration unit is currently in effect, and our location is a standard setback, and wells are located in the northeast-quarter and in the southwest quarter of the section. Our well is spaced in the southeast.

Q. So you're a standard setback, but you're in the wrong quarter section under the rules that govern Basin-Fruitland Coal Gas development?

A. That's correct.

Q. Have you prepared exhibits for presentation here today?

A. Yes, I have.

Q. Would you refer to what has been marked for identification as Thompson Exhibit Number 1, identify this exhibit and review it for the Examiner?

A. Exhibit Number 1 is labeled as an isopach of the Basin-Fruitland Coal. What I'd like to do is also, to save paper, I've combined several things on this map.

First, I'd like to identify the proration unit for the proposed Steward Com Number 1, which is located in the east half of Section 28, outlined in yellow, and the red dot shows the proposed location.

All of the current coal wells that are producing out of the Basin-Fruitland Coal have also been color-coded. The green colors are the wells operated by Hallwood Petroleum, which is the largest operator in this area; the blue wells are Burlington Resources-operated coal wells; and the pink wells are the Texakoma Oil and Gas wells that have been drilled to date.

Also on this map, I have shown with red dots the

coal wells that have been drilled and completed as nonstandard coal wells, two of them by Hallwood, our proposed location in the southeast of 28, and then there's a red dot up in the southeast quarter of Section 22, which has just been -- is being staked by Merrion Oil and Gas of Farmington. And Thompson Engineering just received a letter last week from them, and it's my understanding that they're seeking approval for another off-pattern coal well such as our own at this time.

Q. What interval have you mapped here with this isopach?

A. Okay, the Fruitland Coal, the basal Fruitland Coal, can consist of one or more coals within the Fruitland formation. In this particular area there is one principal thick coal, which is the lowest coal and several coals that are higher up in the section. The lowest coal is the most common interval. It's widespread throughout the area, and most of the operators complete in only the one coal, or sometimes in more than one, but this is the common coal for the area.

And I've made an isopach map of five-foot contour intervals. I do want to point out a slight mistake in the southeast of Section 32. When I contoured a line, I didn't go over quite enough to include a well that had 29 feet of coal. It's miscontoured in this one little spot.

Also on the map is the Fruitland Coal outcrop, which I have -- it's a long dashed line that extends basically from northeast to southwest, across the western portion of the map.

Q. Mr. Emmendorfer, this shows your spacing unit; is that correct?

A. Yes.

Q. And that's a standard spacing unit?

A. Yes, it's a standard east-half dedication. It is composed of a series of federal and fee acreage that's been pooled together for a 320.

Q. That tract is owned by Thompson, by Coleman and by other fee owners?

A. That is correct.

Q. This shows the offsetting Texakoma well, does it not, in the northeast of Section 33?

A. Yes, it does.

Q. And how far from the common lease line is that well?

A. That well is located 790 feet to the south of the common lease line, the same distance to the south of the lease line as our well, proposed well, is to the north of the lease line.

Q. And then you've shown the four unorthodox locations with the bright red or orange dot; is that

correct?

A. That's correct.

Q. And those are the off-pattern wells?

A. Yes.

Q. Okay. Let's go to what has been marked Thompson Exhibit Number 2.

A. Before we do that, I'd also like to point out that on each of the coal wells there's also production that has been reported to the OCD to date. There's a wide variation in production, both of the gas and the water from these wells, that is partly due to quality of the wells and time of operation of the wells themselves.

Q. And those are what? Cumulative production figures that you've shown?

A. That's correct.

Q. All right. Let's move to Exhibit Number 2. Would you identify and review this?

A. Exhibit Number 2 is a structure map. I've drawn this on the base of the Fruitland Coal, the lowestmost coal, the same coal that is isopached in Figure 1.

I might point out that all the color coding of all the wells, the proposed proration unit and all the off-pattern coal wells, all the -- everything is the same, identical from Exhibit 1 to Exhibit 2.

Structure is at 100-foot contour intervals. The

Fruitland outcrop, again, is also marked. And I want to point out the steepness of dip as you go from east to west toward the outcrop, and what we are approaching is the hogback monocline and the Fruitland outcrop.

Q. On this exhibit there are certain USGS wells indicated; is that correct?

A. That's correct. If you will look, Mr. Examiner, in Section 28, the two wells marked LP-4, LP-3, and to the southwest LP-2 and LP-1. These were core test holes drilled in 1982 by the USGS to delineate coal thickness at depth for tract-delineation work.

The purpose of putting these wells on the map was, they've provided additional data points for the structure the map to help pin down the structural configuration in aid of the placing of our proposed well.

Q. So basically we're on the edge of the Basin-Fruitland Coal Pool, and there's a monocline as you move up to the Fruitland outcrop; is that right?

A. That is correct.

Q. How would you generally describe the reservoir in this area?

A. Well, there's been some very good coal wells productive in this area. As you are aware, the base of the Fruitland Coal Gas Pool is a fractured gas reservoir. Within the coal, fractures are known as cleats, but they

behave as any other fractured reservoir in that there's preferential drainage along the predominant fracture set.

Q. And what is the orientation of the dominant fracture set?

A. Okay, from published data I was able to find that with the coal outcropping at the -- in the southwest corner of Section 28, published data reveals that the face cleats for the coal is north 89 degrees east, which is basically an east-west fracture pattern. Butt cleats run at north 11 degrees west.

Q. Why is the orientation of the cleat significant?

A. Well, like any other type of fractured reservoir, such as the Gavilan-Mancos Pool or the West Lindrith Gallup-Dakota Pool or the West Puerto Chiquito-Mancos Pool, fractured reservoirs seem to produce reserves not in a radial drainage pattern but preferentially more in an elliptical pattern along the primary fracture direction.

Recent work by the BLM, when they do drainage calculations to look at offset operator problems, they've started incorporating elliptical drainage patterns to their work, and they use anywhere from -- They have found that the face cleat direction drains preferential to the butt cleat direction, normally, three to four times.

In other words, the long axis of the ellipsoid is three to four times that of the short axis of the

ellipsoid.

So that in this particular case, for the proposed Steward Com Gas Number 1, the preferential drainage is going to be predominantly in an east-west direction.

Q. Now, if we look at this exhibit, the well is in the southeast corner of the spacing unit. What would happen if you were to move the well either to the north or to the west onto the monocline?

A. Well, we would still penetrate the same amount of coal, a little over 30 feet in that basal coal. However, we would produce copious amounts of water, and it's my belief that the well would never dewater and you would never be able to produce commercial quantities of gas, and if we had to go to the north or to the west I would recommend not drilling this well.

Q. What evidence do you actually have of encountering poor wells as you move on to the monocline?

A. Well, besides Texakoma's well in the northeast of Section 5 of Township 31 North, 13 west, also there are wells in Colorado that are adjacent to the hogback monocline.

Q. Are those shown on what has been marked as Exhibit Number 3?

A. Exhibit Number 3 is a production map in La Plata County, Colorado. It's approximately seven miles to the

northeast of the subject well. What I've outlined is the Fruitland outcrop again, and put in cumulative production figures.

I left the structure off, because it's -- Just to keep the thing a little simplified, but it's very structurally similar to the area -- the Steward Com Number 1.

And what I'd like to point out to you, Mr. Examiner, with this exhibit, is that as you get closer to the outcrop, the gas production decreases significantly and the water production increases significantly, and there are a lot of noncommercial commercial wells.

What I'd also like to state is, it's not the fact that we're just right up next to the outcrop. It also has to do with being below the breakover point of the monocline itself that helps control the commercial productivity of the wells.

Q. Basically, when you move on to the monocline, you have a constant recharge of the water; is that -- by virtue of being placed in that position on the structure; is that not true?

A. That's right. And with the constant recharge, you cannot dewater your well and get the pressure sink created to get the gas to desorb from the coal and move toward the wellbore.

Q. All, right, let's --

A. But I'd like to point out in Section 30 and 31, I've highlighted three wells that are in the same pattern, possibility, in the same structural relationship to Section 28, where the Steward Com well is. The Steward Com would be drilled in the southeast corner of the -- quarter of the section. And in Section 31 there is a commercial well located in that quarter section. Yet you go to the northeast or to the southwest, close to the outcrop and up on the monocline, and you get very poor production.

Q. All right. Let's move to Exhibit Number 4, and keeping Exhibit 3 before us, review the information on that exhibit.

A. Exhibit Number 4 is just a blowup of Section 31 from Exhibit Number 3. It shows multiple year production. And what I want to point out is, the gas production is in MCF per year. And as you can see, the wells in the northeast and in the southwest are very poor producers, they will never be commercial. Yet the well in the southeast corner -- quarter of the section is a commercial well.

Q. In your opinion, if we're to drill a successful well in Section 28, will it have to be located in the southwest quarter?

A. Yes, it would.

Q. Is Thompson Exhibit Number 5 an affidavit confirming that notice of today's hearing has been provided in accordance with Oil Conservation Division rules?

A. Yes, it is.

Q. And you notified Texakoma and Hallwood Energy; is that correct?

A. That is correct.

Q. What response have you received from Hallwood?

A. Hallwood submitted a letter to the Commission, and we received a copy of that letter, and in that letter they went on record as saying they did not oppose the Application and that they were, in fact, the recipient of two off-pattern wells themselves in this area.

Q. And they own the tract to the east of the proposed location; is that right?

A. That is correct, they have two wells drilled in that section, one of them being an off-pattern well.

Q. And you're also 790 from that lease?

A. Yes, that's correct.

Q. What geological conclusions have you been able to reach from your study of the area?

A. From studying the area, I've determined that there is a Fruitland Coal Gas reservoir under the east half of Section 28 that has recoverable reserves.

I've concluded that we must drill in the

southeast quarter section to have a commercial well, to have access to produce those reserves.

The reservoir at our location, we're actually closer to the monocline than Texakoma's well directly to the south of it. I feel that although we're going to have a commercial well, we're probably not going to do as good as their well will. That seems to be the trend, that the wells closest to the monocline and the outcrop are poorer wells.

I've also concluded from the cleat orientation that has been published and cleat measurements taken in the same section as our well that the face cleats are predominantly in an east-west direction, and I feel that preferential production and drainage within the reservoir will proceed along this east-west direction.

Without our well at the present location, the proposed location -- Excuse me, the Texakoma well to the south that is 790 feet of the other side of the common lease line from us will probably drain some of our reserves if we're not able to drill our well.

Without our well at the proposed location, these reserves would be drained by Texakoma, and we would not have access to those reserves.

Q. Now, Mr. Emmendorfer, if there is no well drilled in Section 28, will, in fact, reserves be left in the

ground?

A. Yes, it would.

Q. Will Thompson also call an engineering witness in this case?

A. Yes, they will.

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

A. Yes, they were.

MR. CARR: At this time, Mr. Catanach, we would move the admission into evidence of Thompson Exhibits 1 through 5.

EXAMINER CATANACH: Exhibits 1 through 5 will be admitted as evidence.

MR. CARR: And that concludes my direct examination of Mr. Emmendorfer.

EXAMINER CATANACH: Mr. Kellahin?

MR. KELLAHIN: Mr. Catanach.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Emmendorfer.

A. Mr. Kellahin.

Q. Would you turn to your isopach, sir, your Exhibit Number 1? I'm going to give you one of my red pens and ask you to show me how to recontour that 30-foot line to correct the mistake that you said occurred in 32 when you

went the wrong way around the LP-1. Did I remember that right?

A. Yes.

Q. All right, let me have you do that.

All right, sir, you've got it?

A. Yeah, I was already prepared for that.

MR. KELLAHIN: Mr. Examiner, I show you what Mr. Emmendorfer has done to correct the contouring error that occurred on Exhibit 1.

Q. (By Mr. Kellahin) When I look at the isopach, I'm looking at the isopach of the gross coal thickness for the basal coal?

A. Yes.

Q. Did I say that right?

A. The bottom -- the lowest coal within the Fruitland formation --

Q. That's right.

A. -- which is the basal coal --

Q. Yeah.

A. -- that's correct.

Q. And this is not like we would sometimes do in trying to create a net isopach; this is simply a gross isopach of that interval?

A. That is correct.

Q. Yeah, there's no kind of cutoff or other

adjustments made. You simply look at the log and find the top and the bottom of the basal coal?

A. That's correct.

Q. Okay. When we look at the proposed location, the unorthodox location, what is your estimate of the coal thickness at that point?

A. Somewhere above 30 feet but less than 35. Probably 31 to 32 feet.

Q. Okay. The LP-4, that's a USGS core of the coal?

A. It's a -- There was a core test hole where they drilled down through the coal, logged it and plugged the well, just to determine the depth and the thickness of the coal, under federal land.

Q. Okay. Is that reported public information?

A. Yes, it is.

Q. And you examined that information?

A. Yes, I did.

Q. Are we looking at a way to measure the top and the bottom of the basal coal in a way that's accurate to correlate it back to the logs of the conventional oil and gas wells? It's a reliable method by which to identify the top?

A. Yes, they -- The USGS ran a wireline log very similar to what an oil company would run. Normally, an oil company wants to get more data than what the USGS was

wanting, but they ran a log that is often used by operators also to cut costs and to determine depth and thickness of reservoirs in their wells also.

Q. What kind of log do they run? I'm not familiar with these.

A. It was a gamma-ray neutron, which is -- like I said, it's a standard log that oil companies also run.

Q. When you look in the southeast quarter of 28, the LP-3 --

A. Uh-huh.

Q. -- by your analysis, you've got 39 feet --

A. Yes.

Q. -- in that quarter section?

A. Yes.

Q. What's your estimate of the coal thickness up in Merrion's location in the southwest of 22?

A. Somewhere above 35 feet, probably about 37 feet.

Q. Is the amount of gas available in the coal in relationship to the thickness of the coal?

A. Yes. The coal -- Coal has gas absorbed onto the coal itself, and the thicker the coal, the more tons of coal there is, and coal reserves -- the coal has -- is -- gas in place is calculated in so many standard cubic feet per ton of coal, and per ton of coal is in relationship to thickness in an area.

Q. Have you made those calculations for any portion of Section 28?

A. No, I have not.

Q. When I look at the Fruitland outcrop that's shown on Exhibit 1 --

A. Yes.

Q. -- if I am north and west of that outcrop, am I no longer in the coal?

A. That is correct.

Q. Can I presume that if I am south and east of that line, that there's coal available in Section 28?

A. That is correct.

Q. What assumptions can you make about the thickness of the coal as it approaches the outcrop within Section 28?

A. Could you -- I'm not sure I understand your question.

Q. All right, look in Section 28.

A. Okay.

Q. Except for the northwest of the northwest, which is outside the outcrop --

A. Okay.

Q. -- if you go to the other side of the outcrop, everything within that portion of 28 has coal available in it that contains the gas?

A. Yes.

Q. Within that area you have estimated for me at your proposed unorthodox location you have 31 to 32 feet of coal?

A. That is correct.

Q. If I move to the southwest quarter I now have 39 feet?

A. That's correct.

Q. Right? At the control point LP-4 in the northeast quarter I've got about 34 feet --

A. Correct.

Q. Right?

As I move from LP-4 towards the outcrop, what happens to the coal thickness?

A. From my map, I would estimate that it increases a few feet in thickness.

Q. Okay. If I understand correctly, the gas is stored in the coal, and so throughout the east half of 28 there is gas stored in the coal?

A. Correct.

Q. Okay. Mr. Thompson wrote a letter to the Division with this Application when it was processed administratively. It's dated December 23rd of 1996. It says the request is necessitated for geologic reasons and in our opinion result in an economic -- not in an economic well if you're required to be in the northeast quarter,

right?

A. Yes.

Q. Okay.

A. I believe that's what he said.

Q. Coal thickness in the northeast quarter is better than the southeast quarter, isn't it?

A. Yes, it's thicker in the northeast than it is in the southeast, correct.

Q. So a preference to the northeast quarter, if you're using coal thickness as a criteria, shows the advantage is in the northeast quarter as opposed to the southeast quarter, right?

A. Yes, there's more gas in place.

Q. Are you involved at all with the Merrion prospect in the southeast of 22?

A. No, I am not.

Q. It does not involve you at all?

A. Doesn't.

Q. Do you think they're going to make a well at that location?

A. I wouldn't put my money in it.

Q. Would you?

A. I would not.

Q. Would not?

A. It's -- Assuming I had some.

Q. Well, that's probably an assumption for all of us in here, Alan.

Let's look at 27. 27 is where Hallwood has the wells in the east half?

A. Yes.

Q. The off-pattern well that they have in the southeast quarter is the result of taking an existing gas well -- I believe it was a Dakota well --

A. That's correct.

Q. Hallwood took a Dakota well and recompleted it in the coal as an off-pattern coal well, didn't they?

A. That's correct.

Q. And they did so because there was no objection by any of the offset operators; isn't that right?

A. I don't know if anybody objected or not. I wasn't involved with it.

Q. All right. Are you involved in the land transaction by which Thompson attained the farmout of the east half of 28? Are you involved in any of that?

A. No, I'm the geologist.

Q. Is Mr. Thompson involved in that?

A. I don't know. You'll have to ask him.

Q. Who does the land stuff for you guys on this deal?

A. In my company, Chris Coleman, the vice president,

does the land work.

Q. Do you know if Mr. Coleman did the land work on this deal?

A. The majority of it.

Q. Do you know whether or not the ownership position or the right to drill that you have for your company in the east half of 28 results from a farmout from Hallwood?

A. Part of it, yes. It's a 40-acre lease from Hallwood.

Q. Where was their 40-acre lease, do you know?

A. I don't know exactly, no. I know it's in the southeast quarter, but that's as far as I know.

Q. Okay. Were you involved at all in the spacing rules that developed through the Division for the coal gas spacing?

A. No, I was not.

Q. You weren't involved in any of that?

A. No.

Q. Have you read any of the transcripts and the orders to know why the Division selected the alternate quarter sections to place the wells?

A. I did not read that -- I have an idea, but I did not read that, no.

Q. Do you understand the basic idea was to keep these wells spaced apart so we could optimize drainage on

320-acre spacing?

A. Yes, that makes sense to me.

Q. Approval of an off-pattern location for you disrupts that pattern, does it not?

A. That is correct, but that's fine when you're in the middle of the Basin where you have a lot of room to work. But when you come to the edge of the Fruitland Gas Pool, then you have to -- if you're going to be allowed to drill your proration unit, you sometimes have to make exceptions.

Q. Let's talk about the geologic reasons that you contend are the basis for the exception. Coal thickness is not one of them, is it?

A. No, it's not.

Q. Is it the depth of the coal from one location to the other?

A. No, not from one location to the other.

Q. When we look at a standard location in the northeast quarter of 28, what's the approximate thickness of the basal coal in that area?

A. 35 feet.

Q. If I am 790 out of the east boundary of the northeast of 28 --

A. Okay.

Q. -- from the surface to the top of the basal coal

is how many feet?

A. 790 from the east and what footage from the north or south?

Q. Let's take it all the way down and put it -- What's the closest you can get under the coal gas rules to the interior quarter section, the quarter-quarter line?

A. I'm sorry?

Q. The quarter-quarter line between the north half and the south half of your spacing unit, how close can you get?

A. If it's a standup, I believe it's 2510.

Q. I believe that's right. You can get as close as 330 to the interior quarter-quarter line?

A. Yes.

Q. All right. I think it's 130 --

A. 120 or 130.

Q. I think it's 130, Alan.

A. Okay.

Q. All right. Let's assume for purposes of the argument that it's 130 from the quarter line that separates the north 160 from the south 160. Let's assume it could be 130 from that common line. Let's also assume it has to be a 790 setback from the east boundary of the spacing unit.

Okay, at a point located on the map, how deep do I have to get to the basal coal?

A. I really can't answer that, because that would require knowing the surface elevation, and I don't now what the surface elevation is. But we would definitely be higher up on the monocline. And when -- while you ask if the relationship in elevation, subsurface elevation, from one well to the other was a factor, it is not, but being below the breakover point of the synclinal bend of the monocline is a critical part --

Q. All right.

A. -- of the equation.

Q. My question, though, is, in terms of the volume of overburden that's available at a location, will have an affect on the reservoir pressure in the coal?

A. Yes.

Q. The deeper you are, the greater the pressure?

A. Correct.

Q. All right. Is that a geologic component of the decision to decide to drill the off-pattern location, as opposed to a standard location in the northeast quarter?

A. No, it is not.

Q. Okay. So that's not -- All right.

Is the proximity to the outcrop one of the components that concerns you and forms a basis for the geologic belief that you need to be in the off-pattern location?

A. No.

Q. So you can be close to the outcrop and still have a successful coal gas well?

A. As long as you're below the synclinal bend of the monocline, being in the San Juan Basin and not on the monoclinal uplift.

Q. All right. And why does that matter?

A. Because in the basal Fruitland Coal, the coal -- the gas is absorbed onto the coal. The fracture system, which in coal is called cleats, contains water. And what you have to do is draw that water out of the fracture system, or -- to create a pressure sink to get the coal -- the gas to desorb off of the coal. And the outcrop is a source of recharge for the water within the cleat system of the coal.

Q. It's that point I want to discuss with you. The proximity to the outcrop has a relationship to the amount of water coming into the reservoir in the form of recharge; is that not true?

A. That's true. Well, wait a minute, repeat that, please.

Q. Yes, sir. I have a degree in English and I don't do well with that --

A. No, I --

Q. -- so help me with the geology.

A. Okay.

Q. My understanding is that the outcrop at least forms a point in which surface waters, rain and precipitation, subject to evaporation and all the rest, will percolate down through the soil, move in to form a water component, if you will, to the basal coal; the point of potential recharge is the outcrop, is it not?

A. That's correct.

Q. But it's not a concern to you, about how close you are to that outcrop?

A. No, it has to do with the -- being below that monoclinal bend. It's been my observation that wells drilled on the monocline itself, which would be directly communicated with the outcrop, that the wells are not able to dewater, thus providing the pressure sink to get the coal to come off of the -- or the gas to come off the coal and migrate toward the wellbore.

Q. All right, help me illustrate the monocline. Am I correct from seeing this as a drape reservoir of coal, if you will? It comes down off of a slope at a particular degree; it then has a fold to it?

A. Yes, it's a synclinal bend to where it levels out and gradually dips farther into the San Juan Basin.

Q. Okay. Where that reservoir folded, came downslope and folded, there's a point of stress that has

fractured the coal and created this cleat system; is that not true?

A. Well, that helped it forming the cleat system there. The cleat system for the San Juan Basin varies from different parts wherever you are in the Basin, and it is a function of tectonic stress, the monoclinal bending being one of those tectonic stresses, but other larger stresses that affected the whole San Juan Basin also helped create the cleat system.

Q. Okay, starting from the outcrop, moving down this slope of basal coal to the point of some flexure and fracturing, where is it that you don't want to put the well?

A. On the monocline itself, above that synclinal bend.

Q. How do we find the point of synclinal bend where you don't want to be above it? How do you find it?

A. Structure map, structure contour map.

Q. Okay, let's look at the structure map. Down in one of the Texakoma wells in Section 5 --

A. Yes.

Q. -- all right, the 5-1 well down there, is that a commercial coal gas well?

A. From the economic runs and predictions that I've seen, no, it will not be a commercial well.

Q. Okay. Where is it located in relation to this point of preference that you want to be in, in relation to this monocline fold?

A. It looks like it's right in that synclinal bend, or just to the east of it.

Q. It appears on this map that it is south and east of the bend, the synclinal bend, right? Did I read this map right?

A. It's either right in it or just to the south and east of the bend.

Q. All right, so this well has achieved the advantage that you're trying to obtain by being Basin-oriented or Basin-side of this synclinal bend?

A. Correct.

Q. They got on the right side of the monocline?

A. Yes.

Q. All right. When we go up into 27 in the Hallwood section, all of those wells are on the proper side of the synclinal bend?

A. Right.

Q. Are there examples of commercial coal gas wells that are on the wrong side of the synclinal bend?

A. Not that I'm aware of.

Q. The analogy you're attempting to draw with the Valencia wells in Colorado --

A. Yes.

Q. -- the environment there, what's your point of comparison?

A. That as you -- When you're on the monoclinal bend, that you cannot dewater your coals. And then as you get below that point of flexure that you then are able to dewater the coals and have commercial production.

Q. Okay. Is that -- Are the geologic criteria in Valencia equivalent to the geologic criteria in Section 28?

A. Pretty much so, yes.

Q. In Valencia, isn't it a shallower slope, more gentle degree of slope?

A. I don't think so.

Q. What is the volume of water that has to be moved in order to dewater the coal in the Valencia area?

A. I haven't done a study to see what -- how many -- how much water has to be moved before the coal is dewatered.

Q. What kind of peak rate do they get on the gas wells in Valencia?

A. Peak rate?

Q. Yes, after they've dewatered, what's the peak gas rate? Do you know?

A. No.

Q. Was that part of your analysis?

A. Not really, but if you look at Exhibit Number 4, you will see yearly production of -- comparing the good wells to the bad wells.

Q. When we compare the geologic component between Valencia and your Section 28, is the depths to the coal similar?

A. I don't know how close they are, but I would say they are fairly similar, but I'm not -- I don't remember exactly the depths of the wells.

Q. Was that a point of decision by which you drew the comparison, then, between the Valencia and Section 28, depth to coal?

A. No, it had to do with the monoclinal flexure points.

Q. How do the thicknesses of the coal compare in Valencia versus Section 28?

A. I don't remember.

Q. How about the coal gas content between the two areas?

A. I didn't do a study of that.

Q. How about the fractures? That's the point, right? Is it not? It's not the point?

A. No, it has to do with being below the synclinal flexure of the monocline.

Q. So the size and the length of the fracture system

in Valencia was not compared to what you forecast to be the size and the distance of the cleat system, if you will, in 28?

A. I don't know a good way to determine the size and length of the cleat system in any of the coal wells for the logs.

Q. Can you categorize for me the amount of fracture in the coal in 28?

A. No, I cannot.

Q. Is it high, moderate, slight?

A. I'm projecting it to be high.

Q. Are you?

A. Uh-huh.

Q. What's the projection of the amount of fractures in the coal in Valencia?

A. I would imagine that they're high also, but I do not know that.

Q. When you say high, what kind of value are you using when you say it's high?

A. Well, I don't have an exact cutoff, but I would say that you should be able to see cleating within the cuttings of the coal.

Q. What kind of thickness are we dealing with in millidarcies?

A. Thickness of what?

Q. The fracture, how big a fracture am I looking at?
A. Fracture aperture?
Q. Yeah.
A. I have no idea.
Q. As big as your finger?
A. I doubt it.
Q. As big as a hair, what few I have? No, you don't know?
A. I wouldn't want to state.
Q. Can we do it on a comparison of permeabilities? That's really, I think, what I'm asking you, is, this fracture system in the coal is equivalent to the permeability; without it you're not going to get the gas?
A. That's correct.
Q. All right. Have you made a comparison of the permeabilities in Valencia to the ones in Section 28?
A. No, I have not.
Q. Do you have any permeability information on 28?
A. No, I do not. There's not a producing well in there.
Q. Okay. All right, if I'm at the proposed location I'm going to be on the proper side of this synclinal bend, under your interpretation?
A. We're going to be as close as we can get, yes.
Q. All right. What contour line on your structure

map does that put me on? I've got to follow one of these lines out. Is it plus 4100 subsea elevation?

A. When I'm looking at the scale over here on the far right, the first structural contour line that crosses the southeast-southeast corner of 28 is plus 3900?

A. Correct.

Q. The next one up is going to be 4000?

A. Yes.

Q. The next one up, where the red dot is, is going to be 4200?

A. The red dot is 4100.

Q. 4100.

A. It's not labeled on the map.

Q. I see what I'm doing wrong. I missed -- There is no label for that. Okay, it's 4100?

A. Yes.

Q. Okay. When I get up to a point on the structure map where I am in the proper quarter section, I'd have to be at plus what? 4600 or 4500?

A. "The proper quarter section" meaning what?

Q. The northeast quarter.

A. I'd say at least 4700 feet, plus 4700 feet.

Q. All right, the LP-4 is at plus 4968?

A. Correct.

Q. All right. How far down on that can I go and

still be in the northeast quarter? About 4700, you said? Plus 4700? Am I reading this right? You pick a number, I'm not trying to give you a number.

A. I know, I'm trying to understand what you said.

Q. All right. I'm following your structure map, and I want to put my well in the northeast quarter.

A. Why would you do that?

Q. Well, I'm going to tell you in a minute. If I'm putting a well in the northeast quarter, I want to find the point on the contour map that gives me my control point, and what number is that?

A. About plus 4700 or plus 4800 feet.

Q. All right. Okay, you say you want to be at 4100 feet on the structure, and I would prefer that you were at 4700 or 4800. So we've got 600 to 700 feet of difference between us, all right?

A. Okay.

Q. Okay. As I'm going upstructure, I'm getting shallower?

A. Correct.

Q. But you tell me being shallower doesn't matter. The only thing that matters is being downstructure of the point of this synclinal bend, right?

A. The way I understand coal gas production, correct.

Q. Okay. Am I on the proper side of the synclinal bend if I move to plus 4200?

A. I don't believe so.

Q. How about 4300?

A. No.

Q. What happens if I go down to 4000?

A. Then you would be at a nonstandard setback from the lease line.

Q. I understand that. I'm just trying to get on the right side of the synclinal bend.

A. It's somewhere in there.

Q. So your judgment is, the critical point of the synclinal bend is at plus 4100 on this map?

A. Well, we're hoping it will be.

Q. I hope it's more than hope. How do you as a scientist find out where it is?

A. Well, the synclinal bend is right in that area; there's not an exact point.

Q. Okay, so how do we know where it is? How do we find it?

A. By -- If you really wanted to get exact you'd take a second derivative of the structure and find the exact point.

Q. Have you done that?

A. No, I have not.

Q. Why not?

A. Because you can't -- I don't think it's necessary to find the exact point. I think you try to drill in the best place that you can on your lease to ensure a commercial well.

Q. If the critical geologic criteria -- and I think it's the only one I can find from you, Mr. Emmendorfer, is, you want to be downstructure of this synclinal bend point, I'm trying to find out how you determined where that point was in Section 28.

A. Okay.

Q. How did you do it?

A. Looking at my structure map.

Q. I'm looking at it too.

A. We're approximately in that area.

Q. Okay. When I look at the Merrion location that they want in the northeast of 28, it appears that I'm shallower than plus 4800. They're going to be on the wrong side of the bend, aren't they?

A. I think so.

Q. Okay. How do you determine that it's at the minus 4100 point on this structural map?

A. Would you repeat the question?

Q. Yes, sir. How do you find the bend? I'm sorry I'm being dense. I don't see how you as a geologist make a

decision about where that bend is by using this map.

A. By -- The synclinal bend is a large area. It's not one particular single spot, and it's a broad area, and you want to be as low on that bend or below that bend as possible.

Q. All right, let me see if I understand. If we are in an area where the structure is steeper, if you will, the slope --

A. Yes.

Q. -- is greater, that is going to create a point of structural bend that's more dramatic, right?

A. If you go from very steep to very flat, it's -- make a sharper bend than if you had shallower dips.

Q. Let's take a trip down to 32 and 33. See the two sections to the south?

A. Yes.

Q. Do you see how tight the contour lines of the structure are?

A. Yes.

Q. They're really stacked very closely together?

A. (Nods)

Q. Is that an indication that we are in a steeper structural slope presentation than we find in 28?

A. Yes.

Q. Okay. When I look in the relationship between 32

and 33, where is this synclinal bend going to occur there?

A. At the -- in the southeast corner of 32 and the southwest corner of 33, that synclinal bend would be approximately at around plus 4100 feet.

Q. When we go up to 28, the contour lines are spread out, if you will?

A. Yes.

Q. That's going to mean, is it not, that the point of synclinal bend is gentler?

A. Correct, and that's why I indicated that a relationship of a well to the exact outcrop didn't matter so much as where that synclinal flexure point is.

Q. How is the contouring generated on this display? Was this computer generated, or did you hand-draw it?

A. I hand-drawed it -- -drew it.

Q. What is the point of widening some of these contour lines? Look at the spacing of the contour line west and south of LP-4. How come that's spread out that way?

A. I would probably have to attribute that partly to my draftsman who used tape and complained the whole time that my contour lines were too close together and that he had a hard time drafting it.

Q. Will the -- in your opinion, this point of synclinal bend follow a contour line on structure?

A. No, it will vary depending on the -- how -- depending on the structural configuration of the Basin.

Q. Okay.

A. You cannot follow one particular structural elevation due to surface topography at all.

Q. As I fold the monocline to create this bend and create the fracture system --

A. Uh-huh.

Q. -- the face cleats, the main cleating system in the coal, will that be perpendicular to structure, or will it be parallel to structure?

A. From my understanding, the face cleats were formed before the Basin was uplifted into the present configuration, so they should be -- should be in the east-west direction that has been shown at the surface.

Q. So they would not be parallel to the structure?

A. Parallel to the structure?

Q. Well, the orientation of the structure, if you will, is northeast-southwest through 28?

A. Yes.

Q. And you've told me the orientation of the face cleats is more east-west.

A. Yes.

Q. What causes that to happen?

A. What causes -- I don't know I understand -- I

thought I just explained that the face cleats were formed before the present configuration of the Basin was formed.

Q. All right. How was the orientation of the face cleats in this area determined?

A. By surface mapping.

Q. Just the surface mapping?

A. Yes.

Q. Is there any other way available to the industry to determine the orientation of the face cleats?

A. Well, you have to drill a well and take an oriented core. You have to, of course, drill the well first to determine the --

Q. There's none of that kind of information available in this area, is there?

A. As far as I know, there is none.

Q. We've got methane in place throughout the east half of 28 in relation to coal thickness.

A. Yes.

Q. Depth of coal is not an issue, structure is not an issue. You -- How do we recover the gas in the coal in the northeast quarter?

A. By producing the well in the southeast.

Q. So the well in the southeast is going to be able to drain the northeast quarter?

A. Well, I'm not a reservoir engineer, and from what

I understand, that working committee made up a list of things to be able to study exactly how big a drainage area the well, the existing wells are going to be, so I would hate to speculate to the exact drainage influence from the well.

Q. I was just going back to your original testimony about determining a generalized orientation of a drainage shape. You indicated you thought it would be elliptical in preference to the cleat system and that that advantage over the butt cleat was three to four times.

A. Yes.

Q. All right. If that is the expected shape of the drainage pattern, how are you ever going to get the gas reserves in the northeast quarter with the well in the southeast?

A. I don't know.

Q. I don't either.

Were you involved in any of the original staking of this well location?

A. Yes, giving a footage, yes, footage recommendation as to where to put the well, yes.

Q. Is this the only location that was staked in the east half of 28, the proposed unorthodox location?

A. No, it was not.

Q. There was an original location staked elsewhere,

was there not?

A. An application was never made for that, yes.

Q. I understand. Where was the original well staked?

A. In the southeast of the northeast.

Q. When was that done?

A. Probably in around -- about October of last year.

Q. Anything happen between October and now in terms of the available geology to change the location?

A. I became a full-time employee of Coleman Oil and Gas and recommended that we put it in the southeast where it is now.

Q. Was the original staked location at a standard location in terms of footage?

A. I believe that's correct.

Q. And it was in the correct quarter section?

A. Yes.

Q. Apart from Coleman, who are the other working interest owners that will pay for the well?

A. I don't know.

Q. Okay. When did you become an employee of Coleman?

A. November 18th, 1996.

Q. Last year?

A. Yes.

Q. Okay, and it was your recommendation, then, to change the location?

A. Yes.

Q. Was there any other location staked, other than the original location and this proposed unorthodox location?

A. Not that I'm aware of.

Q. Am I correct in remembering that the -- you're not concerned about the recharge of the coal by water infiltration?

A. Yes, I am concerned about that.

Q. You are?

A. That's why I want to drill the well in the staked location.

Q. All right. Let's go to the wrong side of the synclinal bend. Have you studied what would be the amount of additional water that you would have to move in the northeast quarter, as opposed to the southeast quarter?

A. No, I have not done a study of that.

Q. Am I correct in understanding that you want to be on the Basin side of the synclinal bend because you want to be in an area where you have less water in the coal for which to dewater?

A. Want to be able -- Now, the water is still present, but that up on the monocline itself the water --

the coal never seems to dewater because of the recharge.

Q. All right, that's the issue I want to discuss with you. The reason to be southeast of the bend, the only reason, is the amount of water that has to be moved to dewater the coal, right?

A. Yes.

Q. Okay. Do you have examples, other than this Valencia example -- and I'm not even sure that's the example. Do you have examples of wells being drilled on the wrong side of the synclinal bend and what they have had to do in terms of moving water to dewater the coal?

A. No, I don't have any examples to show you.

Q. None at all?

A. No.

Q. Okay. So you don't know, and I don't know, what the challenge is for Thompson to dewater the coal if you're north and west of the synclinal bend, right?

A. Just what all the other operators tell me is their problems.

Q. So I've got gas in place north and west of the synclinal bend, on the wrong side that you tell me, that's available there, and the only reason I can't get it, in your opinion, is, it's going to involve producing more water to dewater the coal, right?

A. Yes.

Q. Have you attempted to quantify the amount of water you have to dewater at the nonstandard location, compared to what you would have to dewater if you're in the northeast quarter?

A. No, I have not, but I think if you look at the engineering testimony and look at economics of the dewatering and gas production, it will become clearer.

Q. I'm simply looking at your testimony, Mr. Emmendorfer, when you told Mr. Carr that you had copious volumes of water to move the closer you were to the outcrop, and I wanted to find out what you meant by that statement. But you haven't studied it; is that not true?

A. We've done economic runs to show the cost of disposing of the water that is produced and what it takes to make a commercial well.

Q. Have you analyzed what the operators are doing in Colorado to move large volumes of water, to dewater the coal in close proximity to the outcrop? Have you studied any of that?

A. Not the mechanics of it, no. I don't get into the production mechanics of the downhole configuration of wells.

Q. Okay. Have you attempted as a geologist to try to quantify the amount of recharge that occurs in this area of the Basin from water moving through the outcrop into the

coal?

A. No, there's published reports that talk about the recharge along the outcrop, throughout the Basin.

Q. Have you studied any of those reports for purposes of this testimony?

A. I've looked at that in the past in researching this area.

Q. Is there a way to compare what you've seen and apply it to 28? In terms of volume? What's the amount of recharge?

A. I don't remember the numbers that were published.

Q. Okay. So you have not attempted to study this water issue to determine the volume of recharge occurring in the northeast quarter, as opposed to the potential recharge in the southeast quarter?

A. The northeast quarter versus the southeast quarter?

Q. Yes, sir.

A. It's -- The amount of recharge should be on the same order for the outcrop.

Q. Okay, so the amount of water to be moved to dewater the coal in the northeast, compared to the southeast, is not controlled by the volume of recharge?

A. Yes, it is, because as you get -- as you're producing water out of the cleat system, you have water

coming in from the outcrop.

Q. What volume of water do you expect to have to move at the proposed unorthodox location in order to dewater the coal?

A. I don't know, because it's variable. There are wells that take very little water to get the classic incline gas curves, and there are wells that take a tremendous amount of water.

Q. All right. You were involved in four of the five Texakoma wells, were you not?

A. As the well-site geologist, yes, sir.

Q. All right, sir. Are you aware of the volume of water that is estimated to be removed from each of those wells in order to dewater the coal at those locations?

A. I don't know the exact volumes. I do know that for a while last summer, several of the coal wells -- I believe it was the Number 5 and the Number 8, located in Section 5 and Section 8, were shut in for several months, because the economics were such that it was costing more to remove the water and dispose of it than they were getting in revenue from the wells, and so they shut them in for several months. That's my understanding.

Q. Did you understand my question? My question was, what was the amount of total water anticipated to be removed from any of those wells? Do you know that number?

A. No, I do not know that number.

Q. Do you know the number of total water that needs to be removed from any of these coal gas wells in this area in order to dewater the well?

A. I don't think any- -- I don't know, and I don't think anybody has a magic number that says when you remove X amount of barrels then you're going to have a producible coal well.

We could -- There's been studies done that show gas inclining with water production declining and the economics of that, and each well is different.

Q. Have you studied the pattern to see the rate of water withdrawal from the coal gas wells in this area?

A. Engineering testimony will show --

Q. That's not your work? I want to ask you, sir, did you study the amount of water being removed from any of these wells?

A. I've looked at the data with Paul.

MR. KELLAHIN: Okay.

Thank you, Mr. Examiner.

EXAMINER CATANACH: Mr. Carr?

REDIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Emmendorfer, your testimony is that there is methane gas under the entire east half of Section 28; is

that right?

A. That's correct.

Q. The issue here is not the presence of the gas, but the ability to produce it; isn't that right?

A. Produce it and produce it at an economic rate.

Q. And isn't that related to the ability to actually dewater the reservoir and produce that gas?

A. That is correct.

Q. And is it your testimony that the farther southeast you move on this spacing unit, the better your chances are to be able to dewater the formation?

A. Correct.

Q. The better your location would be?

A. Yes.

Q. The better your well would be?

A. Yes.

Q. The more gas you could produce?

A. Yes.

Q. If we look at your Exhibit Number 3, does this exhibit not show the relationship between wells drilled close to the monocline or on the monocline and wells that are drilled to the south and the east of the monocline?

A. That is correct.

Q. And doesn't it show you that when you drill wells closer to the monocline, you produce more water?

A. Yes.

Q. And when you produce more water, don't you produce less gas?

A. Yes.

Q. And when you produce so little gas, you -- less gas, at some point you hit a point where you can't even drill the well; isn't that right?

A. That is correct.

Q. And if there is producible gas in the reservoir, then that gas can be drained by your offsetting -- by the offsetting operator; isn't that right?

A. Eventually, yes.

Q. Did you, looking at your structure map, recommend to anyone to drill a well in the northeast quarter of Section 28?

A. No, I would not.

Q. Do you think they could recover the reserves under that tract with a well at that location?

A. No, I do not.

Q. Would they be producing mostly water?

A. My judgment is that that's correct.

Q. Could you drill in the southwest quarter of that section and make a good commercial well?

A. No.

Q. And if you honored the rules that are in place

for this pool and could only drill those locations, would you have reserves there that could never be produced by you?

A. Yes.

MR. CARR: That's all I have.

EXAMINER CATANACH: Just a couple of questions.

EXAMINATION

BY EXAMINER CATANACH:

Q. Why would you necessarily produce more water in the northeast quarter and the southwest quarter than you would in the southeast quarter? Is it related to the distance from the outcrop?

A. The recharge -- yes, as you get -- Unfortunately, there's no magic way of saying that one well is going to have very little water and one well is going to have a lot. But the farther away you get from the outcrop, there seems to be a relation that the less water you have to produce to get that pressure sink, because the -- I guess the transmissibility of the reservoir is such that you could pump the water off faster than the recharge could get from the outcrop all the way to your well.

But the closer you are to the outcrop, that time goes down, and therefore you can never seem to get ahead of the water and get that pressure drop to get the gas to move off of the coal, into the cleat system and into the

wellbore.

Q. So is it your opinion or -- Your testimony on the bend is that it's not a single-point-type thing, it's more of a wide --

A. Yeah, it's -- You can't just, you know, go out on the surface and you can't put your finger at the -- There is a mathematical point if you had a smooth curve, but it's a broad area.

Q. So between which of these contours would you estimate that this bend occurs in the southeast quarter?

A. The southeast quarter, where the proposed location is, I think that we're in that bend, somewhere in that bend.

Q. What would be the upper limit of that thing, where it starts?

A. Well, to be exact, you really would need to take a second derivative of that slope. But I would say that shortly to the north and to the northwest of the proposed location, you're going to be out of that bend and on the monocline itself.

Q. Okay, so once you pass that point, then it's your opinion that's the point where you get into the higher water production?

A. Yes.

Q. Does that increase the higher -- the closer you

get to the outcrop?

A. Yes.

Q. So you could still be on the monocline and not necessarily have a tremendous amount of water production; is that your opinion?

A. No, I think that when you get on the monocline, even though you may be -- The outcrop may be farther away. If it's a gentler slope, you're still going to have water problems, producing water problems, and that you would never get a commercial well.

EXAMINER CATANACH: Okay, I have nothing further.

MR. CARR: At this time we call Paul Thompson.

PAUL C. THOMPSON,

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. My name is Paul C. Thompson.

Q. Where do you reside?

A. I live in Farmington, New Mexico.

Q. By whom are you employed?

A. I'm the president of Thompson Engineering and Production Corporation.

Q. Mr. Thompson, have you previously testified

before this Division?

A. Yes.

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

A. Yes, they were.

Q. Are you familiar with the Application filed in this case?

A. Yes, I am.

Q. Have you made a study of the Fruitland Coal production in the area surrounding the proposed off-pattern well location?

A. Yes, I have.

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

EXAMINER CATANACH: They are.

Q. (By Mr. Carr) Mr. Thompson, initially describe what it is you have prepared for presentation in this hearing.

A. I have prepared a cash-flow analysis for a well that would be drilled in the location of the Steward Com Number 1.

Q. And what does this analysis show you?

A. Well, it shows that a well drilled in this location is on the borderline of commerciality and that any

wells drilled to the north and to the west of this location probably would be uneconomic.

Q. If the well was penalized because of this location, would you be able to go forward with your plans to develop this well as an economic prospect?

A. I don't believe so.

Q. Let's go to what's been marked as Thompson Exhibit Number 6. Would you first identify this and then explain to Mr. Catanach what it shows?

A. Exhibit Number 6 is titled the "Offset Gas Rates". What I needed to do in order to forecast the economics for an undrilled location was to develop a deliverability model.

Normally what I'll do is, I'll pick a well that's structurally equivalent to our proposed location that has actual production, then I'll use that actual production to forecast a deliverability curve. Now, from there, then you can go plug that into your economic model and make a forecast.

Immediately to the south of our Steward Com Number 1 location is the Texakoma well, La Plata 33 Number 1, and this is the closest producing well to the area that is approximately equivalent structurally to our proposed Steward Com Number 1 well.

Also in this same area are two other Texakoma

wells, the La Plata Number 5 well, which we believe to be higher on the structure and actually on the monocline, and the La Plata Number 1 well, which is off the monocline and in the relatively flatter part of the Fruitland Coal area.

What I did -- Unfortunately, though, those three wells, when I looked, only had eight to ten months of actual production data, which in this area that's got classic coal deliverability, you know, increasing rates with time, I didn't feel like those eight to ten months of actual production history gave me a good enough feel to forecast the rest of that curve.

So what I did and is shown in Exhibit 6 are the closest 10 offset wells to our Steward Com Number 1 well that have produced for two years or more.

And what I tried to do was to develop a deliverability model based on the well's first-year production. So to do that, I took the second year and then every year thereafter of the reported data and divided it by the first year's production to get a factor, which is the -- the average of which is at the bottom of that exhibit.

And since the gas rates in all these wells are inclining, that factor, then, is greater than one.

Q. Basically, that's what you have done with Exhibit Number 6; is that right?

A. That's correct.

Q. And you have a typical profile for a Fruitland Coal gas well in terms of the gas rates?

A. For this area.

Q. All right. Let's take a look at what has been marked as Thompson Exhibit Number 7. Can you explain what this is?

A. Exhibit Number 7 is actually the production curve of the Chavez H 2 Number 2 well, which is a close offset, and on this curve I've shown the actual production from the well -- it's been on line for six years -- and then also indicated my model. And as you can see from the actual production of the well and my model that there's a fair approximation.

The wells in this area do look like they level out and start to decline. So at the end of the data that I had -- the six years production was the longest producing time that I had -- I went from that point, then, and just assumed an exponential 15-percent decline per year from then on.

Also listed on Exhibit 7 is the water forecast. And on Exhibit 8 is exactly the same thing that I've done for the gas, I've done for the water on the same 10 wells. I started with the first year's water production, reported water production, and then divided that into all of the

subsequent years, to prepare a water deliverability, if you will, forecast.

And as you'll notice, the average of those factors are all less than one, because the water rates in this area decline with time.

Q. And the significance of the water forecast in your calculations is, you've got to pay to dispose of that water; isn't that right?

A. That's correct. The water disposal rates play a very significant portion of the lease operating costs.

And I went ahead and used this water forecast to run the economics on all three of the wells, including the well that's on the structure, even though there's data that indicates that those wells do not -- the wells on the monocline do not do water.

Q. Let's take a look at Thompson Exhibit Number 9. Would you identify and review that, please?

A. Exhibit Number 9 is actually the production forecast that I used to run the economics. The gas factors and water factors are shown there. And year one in all three of the wells are the actual production reported in this eight- to ten-month period that I have available to me for those individual wells.

And in my economic model, then, I would plug those -- my forecasted volumes of both gas, and then

actually the water production goes in as an LOE expense.

Q. All right. Now, taking this data, you then have done some potential analysis on each of the three wells shown on Exhibit Number 9; is that correct?

A. That's correct.

Q. And are those analyses set forth on Exhibits 10, 11 and 12?

A. Yes, they are.

Q. Let's go to those, but as we first go -- start looking at those exhibits, I think it would be helpful if you would first review for Mr. Catanach the economic assumptions you made in preparing these cash flow analyses.

A. All right. In addition to the deliverability forecasts of gas and water shown in Exhibit 9, I also assumed that Thompson would have a hundred-percent working interest, net revenue interest of 85 percent.

I prepared a drilling AFE which showed that the drilling, completion and the purchase and installation of all surface facilities would cost around $250,000. Lease acquisition costs were approximately $30,000, for a total investment of $280,000.

For a starting gas price, I used the average of the San Juan Basin index price for 1996, which was $1.65 per MMBTU, and I escalated that price at three percent per year from then on.

I assumed the gathering and processing fees were 36 cents per MCF. We tie into the Williams Field Services line in the northwest quarter of the section. And that would leave us, then, a net wellhead price of $1.29 per MCF. I assumed that MCFs equaled MMBTUs in this case, which is probably pretty fair.

I assumed severance tax rate 8.23 percent, ad valorem taxes of 1.64 percent.

Wells in this area require a pumpjack to pump the water and a compressor on the back side to get you into the sales line, so I estimated lease operating costs at $2300 a month, plus $1.50 per barrel for water disposal fees.

Q. Now, those are the assumptions; is that right?

A. Those are the assumptions.

The only thing I had left is that on the lease operating cost, at the end of the seventh year -- starting with the seventh year, I held the water production flat and escalated the costs at three percent per year.

Q. Okay, let's go to, first, Exhibit Number 10. This is your first case. This is the cash flow analysis on the La Plata Number 1. Where is that well? Maybe we should look at Exhibit Number 2, the -- structure map. Whereabouts is the well actually located?

A. The well is located in the southwest quarter of Section 4.

Q. Let's now take a look --

MR. KELLAHIN: I can't find it, Mr. Carr.

MR. CARR: Southwest quarter of Section 4.

MR. KELLAHIN: I'm with you.

MR. CARR: Okay?

MR. KELLAHIN: Yeah.

Q. (By Mr. Carr) All right. Now, let's go to Exhibit Number 10, case number 1, on the La Plata Number 1, and I'd ask you to summarize the conclusions you were able to reach in your cash flow analysis.

A. I apologize for this busy sheet here, but to highlight some of the results of the cash flow -- Let me first explain, there's three pages stapled together. The first one is actually the results, the second one is just the input data in the Aries format, and the last page is just a graph showing the production as we forecast it.

So we're showing a flat production for each year, you know, then it inclines according to my model. And those production rates were manually input into the computer.

we also had the ability here to keep the well going, even though it might have a negative cash flow. You know, sometimes in the early years your water disposal fees exceed your revenue, and in some of your economic models it will just tell you to plug the well at that point. But we

forced it to continue on until we got a positive cash flow.

But most of the results of the cash-flow analysis will be shown in the lower right-hand corner.

In this case the payout, undiscounted payout, is 3.2 years, with a rate of return of approximately 59 percent.

The cumulative reserves produced from this well would be approximately 4.5 BCF.

Q. This is a good well?

A. This would be a very good well.

Q. It pays out in three years?

A. Yes.

Q. All right, let's take a look at the second case, the case for the La Plata Number 5-1 well. Whereabouts is this well actually located?

A. This well is in the northeast of Section 5. We believe this well will be higher up on the structure than our Steward Com Number 1 well.

Q. Okay, and what conclusions could you reach with your analyses on this well?

A. Well, using the -- you know, the same economic model and the actual starting point, it shows that this well will never pay out.

The way that the model worked is that we forced it to stay positive -- or we forced it to continue

calculating, even though the annual cash flows would be negative. And the cash flows actually get positive for a while, but at the end of the tenth year they go negative again and stay negative for the life of the well.

So essentially you never get your investment back on the well. So it consequently has a zero-percent rate of return.

And the calculated recovery is only a .4 BCF of reserves.

Q. All right. Let's now go to Exhibit Number 12, the third case on the La Plata 33-1.

A. The 33-1 is located in the southwest quarter of Section 33. We hope that our Steward Com well is equivalent to this. As you can see on this well, the undiscounted payout is 6.3 years, rate of return is 12.5 percent. It has recoverable reserves of 1 BCF.

Q. What, Mr. Thompson, does this information actually tell you about your proposed location?

A. Well, it shows me that the economics of the Steward Com Number 1 well, if it is indeed indicative of the La Plata 33 Number 1, that it is on the borderline of commerciality and that if any of the parameters that I've used in my economic model are more negative than I have estimated, the well is probably uneconomic.

Q. What's going to occur if, in fact, a well is not

drilled at your proposed location?

A. The recoverable reserves that I've estimated will be probably produced by the well to the south.

Q. Will there be additional reserves that could, in fact, be ultimately left in the ground without a well on this spacing unit?

A. Probably, yes.

Q. The reserves that are -- If the reserves are drained from your spacing unit, what impact will that have on your correlative rights?

A. The way I understand it, we have the right to drill -- to produce gas from our spacing unit.

Q. And without a well you won't be able to do that?

A. That's right. And pretty much, if we have to move it any way, we'll be denied our rights to produce wells -- produce our share of the reserves.

Q. The rules for the Fruitland Coal Pool provide for wells drilled in the northeast and in the southwest quarter of the section to promote orderly development for the pool. Does what you propose, in your opinion, disrupt orderly development?

A. I don't believe so. I think the pool orders certainly were written for the center of the pool. We have standard sections, and you're not encumbered by the outcrop.

There are and have been many exceptions to the pool rules in cases for economic and geologic reasons, and as Mr. Emmendorfer pointed out, there have already been two examples of nonstandard or off-pattern wells drilled in this area.

Q. If this Application was granted, would it prevent Texakoma from producing reserves that are located under its tract?

A. No, I don't believe so.

Q. Will it afford you an opportunity to produce reserves that are under your tract?

A. Yes.

Q. In your opinion, will approval of this Application and drilling of a well at the proposed location be in the best interests of conservation, the prevention of waste and the protection of correlative rights?

A. Yes, it will.

Q. Were Exhibits 6 through 12 prepared by you?

A. Yes, they were.

MR. CARR: At this time, Mr. Catanach, I would move the admission of Thompson Exhibits 6 through 12.

EXAMINER CATANACH: Exhibits 6 through 12 will be admitted as evidence.

MR. CARR: And that concludes my direct of Mr. Thompson.

MR. KELLAHIN: Mr. Catanach? Mr. Thompson.

THE WITNESS: Mr. Kellahin.

MR. CARR: Good night, John Boy.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. The forecast, using your analysis of what you expect to be the recoverable gas for a well drilled at the proposed unorthodox location is what volume, sir?

A. For the Steward Com Number 1 well?

Q. I've got to tell you, I don't know the name of your well. Is it the Steward Com?

A. That's the Steward Com Number well [*sic*].

Q. All right.

A. Real close to 1 BCF.

Q. One BCF?

A. Yeah, that's based on the analogy of the 33 Number 1.

Q. The 33-1 is your analogy?

A. Yes.

Q. Okay. What -- Let's look at that analysis for the 33-1. You'll have to help me find -- I think it was Exhibit 12?

A. Yes.

Q. All right. The 33-1 -- All right, you've got a total, about -- just over a BCF of gas recovered?

A. Yes.

Q. Right? What is the total volume of water produced associated with that well? Do you have a forecast of that?

A. No. Let's see, if we go back, though, to Exhibit Number 9, you know, if you would like to take those daily rates, multiply them times 365 and add them all up, that would be it.

Q. Tell me what you estimate to be the forecast of the total volume of water that has to be dewatered, if you will, from this well in order to have access to that volume of gas reserves.

A. I didn't calculate that specifically. Actually, I did, because I calculated that number, multiplied it times 1.5 and added it to the LOE costs. I don't know what it is.

Q. Where did you get your EUR of 1 BCF for the 33-1 well?

A. That was calculated from the cash-flow analysis.

Q. Yeah, but not the EUR. The 1 BCF of gas, where did you get that? Off the decline curve?

A. Yeah, from the starting point, you know, the actual production from that well, plugging it into the model, based on all the offset wells, assuming that it produces in the same shape curve as all the offset wells,

with the economic parameters that I've already told you about, the model will calculate, then, when --

Q. I understand how this works.

A. -- the well goes negative, and then that's -- it cuts it off. And at that point, that's where you get the 1 BCF of recoverable reserves.

Q. Has the 3-1 been dewatered?

A. It's in the process now, I think.

Q. What do you anticipate to be its peak gas rate?

A. According to my model on Exhibit Number 9, about 336 MCF a day.

Q. All right. And then we can take one of those tables and calculate the total volume of water that will have to be produced to achieve that peak rate, right? You know, you said you hadn't added the numbers, but I assume I can do that later.

A. Yeah, it's -- Well, yeah, I guess it's not a magic number like you don't make any gas at all, and you produce X number of barrels of water, and then whammo, you get up to the peak rate.

Q. Well, I understand --

A. It's a gradual -- as your gas -- As your water declines, your gas inclines --

Q. I understand.

A. -- and that's what, you know, the model showed on

that Exhibit 7.

Q. I'm trying to get a handle on the total volume of water forecasted to be removed from these wells that are on the Basin side of Mr. Emmendorfer's syncline bend and in this area I'm trying to get a handle for that volume. And I think I can do it by adding up some of the numbers on one of your exhibits, at least for the 3-1 well.

A. Yes.

Q. All right.

A. Yeah, Exhibit 8, then, would be for all of the offset wells, and you can see that those water volume numbers, you know, change quite a bit from well to well.

Q. All right.

A. And basically, it's not a function of the amount of water; it's the ratio between the amount of gas you get and the amount of water you get.

Q. Prior to averaging, I want to talk about the range. What is the range of initial water production among the wells in the statistical analysis?

A. Referring back to Exhibit 8, the range looks like it goes from a low of 25 barrels a day to a high of 154 barrels a day.

Q. Okay.

A. That would be the first year.

Q. The analysis is made off of these 10 wells?

A. Yes.

Q. Okay. And the range of water is what again, sir, I'm sorry?

A. From 25 to 154.

Q. All right. Is there a range for the length of time it will take these 10 wells to dewater the coal?

A. Well, you never fully dewater the coal.

Q. I understand. In order to achieve the peak rate, is there an approximation of the length of time it takes to achieve that peak rate?

A. Well, in my model I only had six years of production.

Q. Okay.

A. And it looked like for most of the production curves I looked at, that they had either reached their peak or were close to reaching their peak at the end of the sixth year, by the end of the sixth year. So I would -- you know, to answer your question, I guess, after six years you're at the peak rate.

Q. Among the group of 10 wells selected for this analysis, did any of them achieve a peak rate sooner than six years?

A. Oh, yeah, it's -- you know, it's kind of intuitively obvious that the best producing wells are going to peak faster.

Q. What is the earliest peak rate for those wells?

A. Some of the good wells, you know, that started out at a million a day are actually peaking in the second year.

Q. Do you see a direct relationship to the initial gas rate and how soon that well is dewatered?

A. Yes, the higher the initial rate, the faster the well will dewater. Or maybe it works the other way around.

Q. So to get the recoverable gas that you have forecasted for the 33-1, you did that off of its peak rate? Or what your computer model generated would be its peak rate?

A. Right, which takes -- That peak rate occurs in year six.

Q. And you forecasted year six, and once you got the peak rate, then you chose to decline from the peak rate at 15 percent?

A. Yes.

Q. Okay. Did you attempt to match that with any kind of gas-in-place number?

A. No, I didn't.

Q. When I look at the relationship on the coal thickness map for the 33-1 compared to your location, you have an advantage over that well in terms of coal thickness, do you not?

A. I believe so.

Q. Would that relate directly to the amount of gas to be produced at your location?

A. We don't think that the actual gas in place is a significant factor in the amount of recoverable reserves.

Q. At your proposed location, Mr. Emmendorfer said it was 31 to 32 feet. At the 31 location that Texakoma has, it's 27 feet. Where else is the gas stored but in the thickness of the coal?

A. That's it.

Q. That's it. And if it's thicker coal, you've got more gas in place?

A. That's true.

Q. But you're telling me that that is not going to be a contributing factor in determining how much gas is ultimately recovered in relation to the two?

A. It's not a -- Yeah, we didn't feel that that was the most significant factor, no, that -- I'm not aware of any core data here to calculate a gas in place based on the standard cubic feet per ton.

However, in most areas of the Basin if you look at the amount of gas in place in a Fruitland Coal well, it's significantly higher than what your economic model will forecast that you'll ever produce.

And so, you know, whether the model -- whether

the gas-in-place calculation shows you'll make 10 BCF of gas in place, being the engineer, I want to know how much I can get to the surface, and that looks about like a BCF.

Q. You've got a -- We deal with percentages of recovery of gas in place often before the Division. Do you have an estimate of the percentage of recovery of gas in place?

A. No, without having any core data to estimate what the gas content of the coal is, I couldn't make a guess at that.

Q. The La Plata 1 on Exhibit 10 that we're talking about, let's talk about that. It's in Section 4.

A. Okay.

Q. The La Plata 1 is your Exhibit 10. On Mr. Emmendorfer's isopach map it's got 20 feet of thickness. Its structural position, if you will, is plus 3834. When we look at the 33-1 just to the north, that one is at 3854, so they're reasonably equivalent in structural position. When I look at your Exhibit 10 -- if I can find it -- you've got 3.8 BCF of recoverable gas attributed to that well?

A. Yes.

Q. How did we do that?

A. Based on its first-year production and with the same deliverability model that I've used in all the cases,

that's what the economics show.

And by the way, you know, we think that that would be a pretty close approximation to the well in the northeast of Section 33.

Q. And the well -- The Number 2 well in the northeast of 33 is a newer Texakoma well for which there's probably not much data?

A. None, to my knowledge.

Q. Okay.

A. We think that will be a really good well.

Q. What's your reason for believing the 32 -- 33-2 well in the northeast of 33 is going to be comparable to the La Plata well in Section 4?

A. It would appear to be off the slope of the monocline, down to the flatter part of the Basin, which is approximately where this well, the La Plata Number 1, is. And by analogy, then, it looks like it ought to be a good well.

Q. And so by analogy, you think the Texakoma well, the direct offset to the south, is about 3.8 BCF of recoverable gas?

A. I was thinking that was 4.5.

Q. It may be. Did you have 4.5 for that?

A. Yes.

Q. The area drained by your proposed location to get

you the 1 BCF of gas, what would be the size and the shape of that drainage pattern?

A. Based on Mr. Emmendorfer's testimony, I would assume that it's going to be an elliptical drainage pattern, east to west.

Q. Will it be competing for the same gas reserves with the Texakoma well drilled in the northeast of 33?

A. The production forecasts from -- If the analogy is correct, the well that we propose to get, the Steward Com Number 1 well, is only going to be a BCF well. It's going to start at a lot lower rate, compared to the well that will be immediately to the south of us, start, you know, maybe four or five times as high in production.

So actually they're going to produce four times the amount of gas, four and a half times the amount of gas, as the Steward Com Number 1 well will.

Eventually I see those drainage patterns growing together. But the way I see it, they're growing towards us four times faster than we're growing towards them, all things being equal, you know, cleat structures, et cetera, et cetera. And so probably where those two wells start interfering is going to be well into Section 28.

Q. You've got greater coal thickness in your section than the offset that Texakoma is concerned about, and yet you think you're going to have a poorer well?

A. Yes.

Q. And what causes you to believe that?

A. Because of the ratio of water production to gas production.

Q. What is the estimated volume of water to be produced at your proposed unorthodox location?

A. Again, you would have to sum up, you know, multiply the daily rates, multiply times 365 and sum those up.

Q. Have you attempted to quantify or estimate the volume of water that you would produce if you were required to be in the northeast quarter of 28?

A. No, I don't believe that the absolute value of the volume of water is significant. It's the ratio of the gas produced to the amount of water, and whether or not it's economic to dispose of that water. And those wells --

Q. Have you made an examination of that ratio in the southeast quarter compared to the northeast quarter?

A. Well, essentially what we're saying is, yes, the Exhibit Number 10 would be a well that would be drilled in the southeast quarter, and Exhibit Number -- No, excuse me, 12 would be in the southeast quarter and Exhibit Number 11 would reflect the well drilled up in the northeast, a well that's on the syncline.

Q. And 11 is the La Plata 5-1, that's the Texakoma

well in the northeast of 5?

A. Right.

Q. All right. That well's not been dewatered yet, has it?

A. Nor do we think it ever will be.

Q. All right. And that's your point of comparison?

A. Yes.

Q. All right, let me see how you did the model. If you'll look at Exhibit 7. Now, this is not a reservoir simulation model; it was done with a computer-assisted program, is it?

A. No, this is just based on the actual production reported by -- all these are Hallwood wells -- to the Oil and Gas Commission. This data is all available, and I pulled it off of *Dwight's*.

What I was trying to do was make a model that was based on the first year's actual production, so that I could use the actual data from the three wells in question as a starting point.

Q. All right. When we look at Exhibit 7 --

A. Yes.

Q. -- how many wells are going into this analysis?

A. This is just an example. This is only one well here, showing the model, which is the sum of the 10 wells.

The actual production data is only the Chavez H

Number 2.

Q. All right, the Chavez H Number 2 is located where, sir?

A. It's located in Unit Letter H of Section 2, 31 North, 13 West.

Q. You're using a well that's one, two -- at least three miles south and east of our location?

A. It just happened to be the first well on the list. If you look at the factors there, you know, where it says second year divided by first year on Exhibit 6, you know, there's a few anomalies there. But actually, that's a pretty close trend. For an engineer I'd say that's a pretty good approximation.

And you can actually plot the model on any of those 10 well deliverability sheets, and you'll see that it's a fairly close approximation.

Q. When I look at the Exhibit 6, what I'm really looking at are having all these values for these wells averaged?

A. Those are the actual reported production on MCF per day.

Q. I understand. And then it's averaged, and the averages, then, are used to make the modeling forecasts on 7?

A. Yes.

Q. Have you attempted to construct an Exhibit 7 for each of the individual wells that are contained on Exhibit 6 to see what happens?

A. That's what I say, that in most cases it's going to be a pretty close approximation.

Q. So despite the wide range of differences in initial rate and water rate, you're averaging ratios, aren't you? That's what's happening, you are averaging ratios?

A. Averaging ratios. Yes, I guess that's true.

Q. Well, sure, you've got 10 wells and you're averaging these ratios, and you're plotting them on 7.

What I'm asking you, have you taken the individual data for each of the individual wells and not averaged them but given us a forecast like we see on Exhibit 7?

A. I'm not sure I understand the question.

I have the production curves for each individual well, and I could take my models with the starting rate for each individual well and draw the model on the actual production curve, and I think you would see a close approximation to the model, to the actual production curve.

Q. When we look at the actual rate on the Chavez H 2, something's occurring in 1994-95, where it looks like at the end of 1994 it attains what I would see to be a peak

gas rate, and then it begins to approximate some type of decline. Do you see that?

A. That's correct.

Q. What's your estimate of the actual decline on that well from the end of 1994 through the end of 1995?

A. I didn't actually calculate it.

Q. It appears to be less than the 15-percent decline that you're using for your average in the model?

A. It appears to be pretty close to the 15 percent to me.

Q. Have you done any engineering studies, Mr. Thompson, with regards to this project, to try to quantify the volume of water that is -- needs to be removed in the northeast quarter if you were required to be in the northeast quarter of 28?

A. No, not the finite quantity of water.

Q. Do you know the amount of recharge that the east half of 28 might be subject to, in terms of its water volumes?

A. No, I don't.

Q. When we look at the drainage pattern at your proposed location, can you approximate for me how much of the area contained within the east half of 28 will be drained by your well?

A. No, without drilling a well I don't have enough

reservoir parameters to estimate a drainage.

Q. So you -- At this location you can't estimate the amount of area to be drained within your own spacing unit by the well at this location?

A. No, that would require a gas-in-place figure, which I don't have.

Q. Okay, and correspondingly, we can't tell how much of the gas outside of your spacing unit you would drain with a well at your location; you simply don't know?

A. I just don't know.

MR. KELLAHIN: Thank you, Mr. Examiner.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Thompson, as I understand it, you're saying that your well drilled at the proposed location is going to resemble the behavior of the La Plata 33 Number 1; is that correct?

A. That's the closest producing that we thought, you know, was on the same structural place as our well.

Q. Okay, but you said that that well, your well would initially produce only about one-fourth what that well produced; was that your testimony?

A. Well, looking at the -- Let's see, that would be Exhibit 9 -- I'm sorry -- Yeah, Exhibit 9, actually, is the deliverability forecast for the three wells.

Q. Uh-huh.

A. So I guess, right, if we had a well that was down in the flatter part of the section, you know, I'm forecasting that would start, if it was the same as the well in Section 4, at 183 MCF a day, average for the first year, whereas the 33-1 would produce about 45 MCF per day. So I'm not sure exactly what the ratio is there but, you know, it's significantly higher.

Q. So you're saying that the well at your proposed location would behave more like which well, the --

A. The well -- The Steward Com, I think, would be like the 33-1.

Q. Okay.

A. The well that's in the northeast of 33, I think, will behave like the La Plata Number 1, because it's off the flank of the dip.

Q. So can you tell what your initial gas production from your Steward well might be?

A. You know, we're assuming it will be close to this 33-1, so we're assuming that our initial, first-year average gas rate is going to be 45 MCF per day, 23 barrels of water a day.

Q. Somewhere in your testimony there was something mentioned about a factor of four, as opposed to --

A. I think that was just the ratio of the reserves

recovered from the La Plata 33-1 versus the reserves that were to be recovered in the La Plata Number 1, which I think it was 4.5 BCF reserves for a well like the La Plata 1 that's down in the flat part of the coal, and probably about a BCF of reserves on a well that's in the flexure, versus a point for -- if you're on the slope.

And again, that's not gas in place; that's economically recoverable reserves.

Q. Okay. At this point in time, you estimate that recoverable gas from the Steward well is 1 BCF?

A. Yes.

Q. Okay. And you don't have an estimate of how much water is going to have to be produced?

A. No, I'm -- No, not exactly. The way I'd have to calculate that is, I've given daily rates for the first six years, so you'd have to multiply those times 365, and then add all those up and that would give you the total amount of water that we think will be produced in the first six years.

But the well -- You know, the dewatering is a continual process, so it's...

And these -- and the wells on the 10-well study are classic examples of coal-seam production in that the -- you know, the gas increases with the declining water rates.

Q. Do you think it's necessary to place a penalty on

your well to protect correlative rights?

A. You know, with the forecasted economics of the La Plata 33-1, that's, you know, to me real borderline economics there anyway. Six-year payout and a 12.5-percent rate of return is a pretty skinny project going into it.

Any kind of penalties or any of the parameters in the model, if they're worse -- if I'm off on the gas prices, say, or my LOE costs are higher, I think the well is a loser.

Q. Well, do you feel like you're adversely affecting the correlative rights of Texakoma to the south?

A. Not at all. I don't see how our well could possibly beat them to the punch if they start out at such a much higher rate.

Q. What is their well producing at this point?

A. The well in the northeast of 33, to the best of my knowledge, has not been first delivered yet. It was drilled last summer sometime.

Q. But you feel like they'll be adequately -- they can adequately protect their acreage with that well from offset drainage?

A. If they produce it, yeah, I think so.

Q. If you were required to drill a well at a standard location in the northeast quarter, is it -- It's just the fact that there's going to be, in your opinion, so

much more water to produce that that's going to make it uneconomic?

A. Whether it's the quantity of water, I'm not sure. But I just don't think the gas will come fast enough to make it economically profitable to continue to pump the well.

Now, there's wells in Colorado that make 500 barrels of water a day, and they're economic because they're also making 3 million of gas a day.

You know, from what we project based on other wells that are on the same structural position here, there's not going to be enough gas to pay for the water production, and the well will be uneconomic.

Q. So you believe the initial -- an initial gas rate for a well in the northeast quarter would be less than 45 MCF a day?

A. Yes.

Q. With maybe more water?

A. You know, looking at the 5 Number 1, which is up on the flank, the water is about the same, 25, 23 barrels a day. However, the gas production is only half, 21 MCF a day, versus 45.

EXAMINER CATANACH: I have nothing further of this witness.

Mr. Carr, I don't seem to have a letter in our

file from Hallwood. If you have a copy of that --

MR. CARR: I have a copy of a letter addressed to Bill and dated January the 9th, Hallwood.

EXAMINER CATANACH: Excuse me?

MR. CARR: I have a copy of a letter from Hallwood dated January 9th to LeMay. It's in reference to this location, and it says we're not opposing the nonstandard location for this well as Hallwood has also benefitted from two similar nonstandard locations. I can give you a copy of it.

MR. KELLAHIN: Mr. Examiner, it would be my preference for you simply to accept the fact that Hallwood has waived objection. Mr. Kevin O'Connor goes on for pages to narrate his discussion, and I prefer not to have his hearsay statements considered by you. If Kevin O'Connor has a position he should come and testify. I have no objection to the letter being taken as a waiver of objection, but I would ask that you ignore all his argumentative discussion.

MR. CARR: There's a lengthy discussion about -- it seems to me, about seeps in the area, and we're not offering the letter for that at all. It has nothing to do with this case. But there's a copy of the letter, if you want to see, the fact they have waived objection. That's the only purpose for which we'd offer it.

EXAMINER CATANACH: Let me ask you, Mr. Kellahin, I've also got letters that the Division has received from Robert Bayless and Benson-Montin-Greer. In those letters they do object to the location, and they do express some opinions regarding drainage. Do you also not want me to consider these?

MR. KELLAHIN: I don't think that's fair, Mr. Examiner. You can take them as objections, but it's not fair for Mr. Greer to express an opinion in a letter and not come and testify.

MR. CARR: I agree. What color paper is Mr. Greer's letter on?

EXAMINER CATANACH: We'll enter this Hallwood.

MR. CARR: I think Mr. Kellahin's statement is correct. When people want to narrate other, than just waiving or stating an objection, I think beyond that the letter is -- really shouldn't be considered.

MR. KELLAHIN: It's not fair to anybody, Mr. Examiner.

EXAMINER CATANACH: Okay, this witness may be excused.

Let's take a break here before we start.

(Thereupon, a recess was taken at 3:12 p.m.)

(The following proceedings had at 3:30 p.m.)

EXAMINER CATANACH: Go ahead.

BRADLEY W. SALZMAN,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. Bradley W. Salzman.

Q. And where do you reside, sir?

A. Farmington, New Mexico.

Q. And what's your occupation?

A. I'm a petroleum engineer, a contract consultant.

Q. Give us a summary of your education.

A. High school, BS degree in petroleum and natural gas engineering from Penn State University, 1980.

Q. Summarize for us your experience with the coal gas production in the San Juan Basin.

A. I came to Farmington with Amoco in the mid-Eighties, basically at the height of all the activity, Fruitland Coal-wise. I'm in the beginning stages of a lot of the completion technology and a lot of the reserve estimates and did a lot of work with Amoco as far as drilling, completion and the reservoir end of the Fruitland Coal.

Q. What's the time frame of that involvement?

A. 1984 through mid-1986.

Q. Subsequent to that, describe your involvement with the coal gas production and exploration.

A. As a consultant, drilled in excess of 30 wells, have completed in excess of 50, and operated pumpingwise on a contract basis 60 or more Fruitland Coal wells.

Q. What's your responsibility for any of the Texakoma coal gas wells that were identified on the exhibits introduced by Thompson?

A. Presently, I'm doing their engineering, field engineering, I've taken a look at fluid levels, analyzing that production, and I also had a contract operating service where my guys were out there actually on the ground, doing the work, operating the wells.

Q. Are you familiar with drilling wells near and producing coal gas wells from the vicinity of the outcrop?

A. Yes.

Q. Have you been provided geologic displays by Texakoma as part of your preparation?

A. Yes.

Q. In addition, did they provide you all the production and other engineering data they had available in their office for your preparation today?

A. Yes.

Q. And based upon your work, your experience and

your preparation, do you now have engineering opinions and conclusions concerning the Thompson Application this afternoon?

A. Yes.

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

EXAMINER CATANACH: Mr. Salzman is so qualified.

Q. (By Mr. Kellahin) Let me circulate the structure map, Mr. Salzman.

I show you what is marked as Texakoma Exhibit Number 1, Mr. Salzman. This display was generated by the draftsman with Texakoma in Dallas, was it not?

A. Yes.

Q. Describe for me the color code, and then we'll talk about the information.

A. This is a structure map of the same area as Thompson Engineering Exhibit Number 2, Texakoma wells in green, Hallwood wells in blue. These are all Fruitland completions. We do not have the core holes from the USGS spotted on here. And a yellow well in Section 28, being what Texakoma considers the best standard location and a red dot denoting the nonstandard location as applied for.

Q. Have you discussed the information contained on this exhibit with the draftsman that prepared it and with David Williams of Texakoma, the technical manager for that

company concerning this data?

A. Yes.

Q. Have you independently satisfied yourself to the best of your knowledge that the information shown on this display is true and accurate?

A. Very accurate.

Q. Have you utilized this information from which to illustrate some of your engineering conclusions and information?

A. Yes.

Q. When we look at the Texakoma wells, they're identified by the green triangles, are they not?

A. Yes, sir.

Q. And have you become knowledgeable about those wells?

A. Yes, sir.

Q. There is some difference in this structure map and Mr. Emmendorfer's structure map?

A. Yes, there is.

Q. The opportunity for Thompson to drill a well in the east half of 28, in order to recover gas reserves attributable to 28, do you have an opinion as to whether it's necessary to put that well at its proposed unorthodox location?

A. I see no reason why it should be.

Q. You do not see a reason why it should be?

A. No.

Q. When you look at the standard location in yellow, do you have an opinion as to whether that represents a viable well location in which to access any recoverable coal gas in the east half of 28?

A. The way the present pattern is set up, a standard location, in my opinion, would produce more of those reserves under the east half of 28.

Q. Summarize for us the reasons that you have reached that engineering conclusion.

A. Standard pool rules call for a southwest and northeast quarter section well, being 320-acre spacing.

Q. Is that simply an arbitrary rule, or does it have meaning and significance for the coal gas development?

A. It -- Yeah, it has meaning and significance. I don't think it was arbitrary. I'm not saying that it won't change in the future.

However, to eliminate the kinds of things we're getting into with the alternate location, the proposed nonstandard location, that was the reasoning for those rules, and to provide for adequate drainage, protection of correlative rights and a fair and equitable distribution of those reserves.

You were talking earlier about drainage patterns,

shapes of such, as they relate to positions on structure, fracturing, natural and induced fracturing, under stimulation. These aren't always going to be reserves attributable to that gas under that lease line. However, it provides for a fair and equitable distribution of those reserves and recovery.

The red dot, the applied-for nonstandard location, in my opinion, really takes that fair and equitable right out of the ball park. And I think, as Mr. Thompson testified earlier, there would be reserves left in the northeast section of 28 by the nonstandard location.

Q. Do you concur in Mr. Thompson's conclusion that the well in the northeast of 33 is going to recover more than 4 BCF of gas in relation to what he forecasts to be a BCF of gas recovered in the southeast of 28 by that well?

A. Let me go into some comparisons. Mr. Thompson's testimony was somewhat unclear in my mind because of the averaging of ratios, modeling of production curves, with ten wells in the area, but with very limited data, as far as long-term.

Texakoma and Hallwood both make their reserve estimates based on the thickness of the coal and the gas content of that coal in the area, defined by vitronite reflectance.

Like Paul was saying, you would need a

pressurized core and do a degasification process to get an exact and an actual. But the published data in this area say that a 320 with an average of 30 feet of coal has 12 to 14 BCF of gas. And a recovery of 35 to 50 percent gets you in that 4-BCF range. And the model fits for the 33-1 well in the northeast quarter.

Now, how we get to a quarter of that, I think Mr. Emmendorfer said that there was no difference in the coal, the quality of the coal, the thickness of the coal or the proximity to the outcrop would make any difference.

So I don't understand how a well, which is actually a 57-acre offset to the 33-1, would produce a quarter of the reserves of the 33-1. That -- I can't get that engineeringwise.

Q. Mr. Emmendorfer is concerned about his position in relation to the point of this anticlinal flexure or bend, and his concern is founded, as I understand it, based upon the expectation that if he's in the northeast quarter he's going to have larger volumes of water, which he's not able to quantify, but which concerns him and may affect his well.

He draws by analogy information from Valencia in Colorado.

Do you have experience and knowledge about the Valencia area, and can you apply that in comparing or

contrasting the coal gas production that he is analyzing with what we would see in Section 28?

A. You bet.

Q. Let's have you do that.

A. Reserves are directly proportional to the amount of coal and the gas content of that coal. The La Plata area, as we can see, it's basically 30 feet of coal.

Q. "La Plata area" meaning here in the 28 area --

A. Right.

Q. -- of this case?

A. The Valencia Canyon is 60 to 90 feet of coal, depending on where you are from the outcrop.

Vitronite reflectance studies have shown the La Plata area, for coal -- or gas content of the coal, to be about 200 to 300 MCF per ton. The Valencia Canyon unit area is in excess of 1000 standard cubic feet per ton. When you compare those two, it's basically three times the gas content.

In published data, in AAPG journals, they talk about the fracture fairway, or the high-productivity fairway, which runs directly into the Valencia Canyon area. What controls that is a very highly fractured scenario.

Q. Do we have that fractured occurrence fairway in the La Plata area, the 28?

A. I think Alan -- Alan said he hoped it would be

high, but I think that's a relative term. Relatively to the -- if we would call the Valencia Canyon unit, or area, high, which it is because it's the most fractured area in the Basin, the cleat system at deposition in the La Plata area would be classified as moderate to slight.

Q. The gas content of the coal in Valencia, compared to La Plata, the advantage is to Valencia?

A. Oh, you bet, three times as much. Thickness -- Now, I'm talking about coal content per ton of coal [*sic*].

Q. I understand.

A. Thickness is another 20 to 30 percent higher.

Q. When Mr. Emmendorfer looks at the high water production -- When Mr. Emmendorfer looks at the high water production in the Valencia area, what is the range of water production of those wells?

A. They're more highly fractured. The water production in that area averages over 150 barrels of water a day, in the Valencia. So you're looking at a more highly fractured, more conductive reservoir. To compare that to here as far as production characteristics, it's not even close.

Salinity data shows lower salinities in that northern part of the Basin, in the coal, and they -- This leads into the recharge question. Yes, there is a lot of recharge in that Valencia area. This is evidenced by

salinities, very, very low, less than 100 parts per million chlorides.

That is not the case here. There's two things that control that, and that's the hydrodynamic conditions of that Valencia Canyon unit area -- They have a higher potential because of elevation. The recharge area to the north, obviously, those mountains around Durango have -- I think it's about four times the amount of annual precipitation.

So that, combined with the better reservoir characteristics, gives that Valencia Canyon area a higher recharge, that is not comparable to the recharge in the La Plata area.

Q. Mr. Thompson is concerned that if he is required to put his well back at a standard on-pattern 160 acres, that he will be exposed to higher water rates, and because he's only recovering a BCF of gas, he's concerned that his well will be uneconomic unless it moves closer to the Texakoma well.

One of the analogies he draws is to look at the Texakoma well in Section 5, the 5-1 well, and he condemns that well.

What is your information from Texakoma and your analysis of the potential for the Texakoma well in 5-1?

A. The 5-1 well has made quite a bit of water, more

water than the 4-1. However, this distance to the outcrop at the 5-1 is actually less than either the nonstandard or the standard of Thompson.

Q. When we look at the 5-1, it's 2520, as plotted on Exhibit 1?

A. Yes, sir.

Q. And then we look at either the standard location or the unorthodox location for Thompson, and the footages are shown there?

A. 2980 at the standard, 3980 at the nonstandard.

Q. Despite the fact that the Texakoma 5-1 is closer to the outcrop, what do they forecast and what have you analyzed to be its estimated ultimate gas recovery?

A. I think Alan's testimony said that the coal was relatively the same, gas contents were the same. Texakoma's reserve analysis projects the 5-1 to be about a 3-BCF well.

Of the five wells there, it has got to recover the most water, and that being about 43,000 barrels of water.

Now, that's not a cumulative water over the life; that is 43,000 barrels to reach the peak rate.

Q. Do you recall what is being forecast as the peak rate for the Texakoma 5-1 well?

A. About 450 MCF a day.

Q. That's forecasted to be a commercial success?

A. Yes, sir.

Q. All right.

A. The -- As Paul was talking about, the early time, it's going to be uneconomic.

Q. Uh-huh.

A. However, the gas desorption and the gas dewatering process is not anywhere correlative to standard oil and gas production, and you have got to go through that process of dewatering to get your gas to come.

Desorption rates in this area, 50-percent reduction in bottomhole pressure provides you about 10 percent of your reserve.

Q. Let's try to quantify in this area the type of initial water production that's occurring. Let me show you what we've marked as Exhibit Number 2.

Again, Exhibit Number 2 uses the same base map on structure, and then it plots by color code the various wells in the area, showing the first monthly average daily water production rate; is that not true, sir?

A. Yes, sir.

Q. All right. Help us analyze and understand what's occurring in this area, as contrasted to the Valencia area, in terms of these initial monthly average water rates.

A. The initial monthly averages -- I mean, we can

take a look here, 37, 25, 53, 33, 75 -- I mean, taking a look at what we call the synclinal area, these are relatively low, as compared to some of the wells in Valencia Canyon. Very high productivity. Initial potentials up to 10 million a day and 400 or 500 barrels of water a day. This is nowhere near that type of prolific production.

Q. Draw some comparisons or dissimilarities for us. Next to each well symbol that's colored there's a number. That number represents what? The first monthly average water for that well?

A. Right.

Q. When you look at that and find that well's position in relation to the outcrop or this point of flexure, there's no direct correlation, is there?

A. No, there isn't.

Q. For example, in 27, when you get that Hallwood well it's got 122 barrels a day at plus 4100, right?

A. Right.

Q. And then you go back over and look at Section 5, the 5-1, which is closer to this point of flexure, and it's only making 37 barrels of water a day?

A. Right.

Q. Okay.

A. These -- Your next question, obviously, is, what

causes this?

Q. Yes.

A. The natural characteristics of the well and the reservoir, number one. However, what we do to that well, how we complete that well, what we've done to the well during the drilling and completion process also affects that, and can be quite dramatic.

For example, in Hallwood's 22 wells, they completed 14 of them with an open-hole packer, which kept the cement off of the basal coal. And when you compare those two completion techniques, the gas and water rates both are about double for the wells that were, let's say, kept cleaner during the completion.

Another thing that can affect that is your stimulation job. Most of these wells are frac'd with a gel or a foam and 100,000 pounds of sand. Texakoma, at one point, thought that two grades of sand would help them out, two sizes. Hallwood didn't necessarily believe that; they used primarily 24 sand. But frac lengths, frac widths all affect these numbers.

So to try to say that these wells in this area should average this and compare that to my location or your location, there's a whole lot of things that go into that.

Q. All right. In order for Mr. Thompson's analysis to be reliable, do you not have to start with the

assumption that all these wells are drilled and completed in identical situations?

A. For the best statistical reliability, that's true.

Q. And if the initial oil or water rate of a well has been affected by the manner of completion and stimulation, that is going to distort whether that well's position in the reservoir is affected by its position or by its completion; is that not true?

A. That's true.

Q. Mr. Thompson is concerned that it's not the total volume of water to be produced, but it is the ratio of gas rate to water rate and the economic consequences of that. I believe that was his position. And he's finding that his forecast is that his gas rate will be low in comparison to the water ratio, and therefore his well would be uneconomic and it would have -- it failed.

A. Averaging ratios, statistically, in statistical theory, will tend to narrow your band. It does the same thing as throwing percentages around. Politicians like to do that.

If you take -- I've plotted his model, and looking at -- well, number one, the sample of wells, they're all close, they're relatively close. It's a small sample.

To try to draw conclusions from only three wells that have been on for six years or more and make that your model, only three wells have been on for five years or more, only four of those wells on for four years or more, that is not statistically a very good sample of wells.

As you plot this data, you find that his ratios in high-IP wells are relatively close. And then, as you come back and take a look at that first-year average production, these things vary wildly.

So this ratio -- attempt at averaging ratios falls apart at low rates. I mean, it ranges from a 1.7-fold increase to a 10.7-fold increase. I mean, that's a -- Let me use a percentage. That's a 1000-percent range, from top to bottom. Statistically, that's not a -- I wouldn't use this for statistical accuracy and reliability.

It is a method. It seems to work at higher deliverabilities, but it falls apart in the low ranges.

Now, you ask, where are those low-range wells? Well, obviously, it's right where we're dealing with, because Paul feels his well is going to be marginally economic in that low range.

But to take his model and apply it to any of those low-rate wells, we have no statistical consistency to do that, which shows -- I expressed a concern over a 57-acre offset well recovering only a quarter of the 33-2 well

in the northeast quarter.

That illustrates the statistical unreliability of this model. You wouldn't expect a well, a 57-acre offset, to be a whole lot different reservoirwise, pressurewise, water-saturationwise, thicknesswise, gas-contentwise, and should be relatively close on ultimate recoveries. But it illustrates how this model falls apart at low rates, because of the averaging of ratios.

Q. Let me show you an Exhibit 3 to illustrate where these wells are in terms of their de-watering process, tabulates the cumulative water produced.

Use this as illustration for us, Mr. Salzman, show us where we are in terms of dewatering the coal in this area.

A. Well, obviously these wells have -- the -- Well, let's just take a look at the colors on the map and compare that to your Exhibit Number 1 and find the blue Hallwood wells. In relation to Texakoma's wells, they have had higher water recovery.

This is completely expected, due to the fact that they were drilled in the early 1990s, and a few of them have been on production for six years or more. The Texakoma wells have been on all for less than two years. The 33-2 that's in question here was just first delivered in November of 1996. We have very, very limited data on

that well.

Q. At this point is there -- have these wells been dewatered to the point where we can make decisions about granting exceptions to the on-pattern requirement of putting wells in the northeast or the southwest quarter sections of a section?

A. Now --

Q. The Hallwood exception, I guess, was a matter of convenience for Hallwood.

A. The southeast of 27?

Q. Yes, sir.

A. That was an existing wellbore?

Q. Yes, sir.

A. Anytime you can use an existing wellbore, they own the entire 640, and they were -- they may see some interference. These are 160-acre offset wells. They will probably see some interference between those two.

Q. Have we reached the point of producing the coal in this area to make accurate and reliable decisions about the necessity to grant exceptions for off-pattern development?

A. No, I -- The geology, proximity to the outcrop, this synclinal theory, all of Texakoma's wells and the contested well here are in that area. I -- As an engineer looking for accuracy, I wouldn't say that any predictions

can be made, as far as the necessity of a nonstandard location.

Q. Would the granting of this Application create a precedent in here for the off-pattern development, which will create 160-acre spacing?

A. Not only do I think it's detrimental to the fair and equitable distribution of reserves, it -- As Mr. Thompson admitted, it is not the most efficient mechanism by which to drain this reservoir. As he said, there would be reserves left in the northeast quarter, should the nonstandard location be approved.

Q. Are you familiar with the requirements of the coal-gas spacing rules for the San Juan Basin that requires significant reservoir simulation and study in order to take an area to 160-acre gas spacing?

A. I have not been involved in any of those, but I understand it's a quite lengthy process. And the level of accuracy and the level of in-depth investigation is fairly high.

Q. In your opinion as an engineer, are we ready to engage in 160-acre development in this part of the Fruitland Coal Gas Pool.

A. No, when I have 320s on standard pattern in an area that have only been on two years or less, no, I don't see any way to draw any conclusions to densify to 160, let

alone 57.

Q. Is there any way to construct a penalty to balance the equities between Section 33 and a well drilled in an off-pattern location in 28?

A. Does that require a yes or no answer? I'm sure there is.

Q. Well, let's talk about the things that we would have to know.

A. Okay.

Q. When we look at standard spacing patterns in the northeast of the southwest, the assumption with that pattern is that there will be some off-spacing-unit drainage under that situation; is that not true?

A. You bet.

Q. And let's look at what happens when you stay on pattern. If you'll look at the area of Sections 3, 4, 34 and 33, all those wells are on pattern?

A. Everything Texakoma has drilled is on pattern.

Q. Illustrate for me as an engineer how that pattern remains a useful way to balance correlative rights in competition in the reservoir, by honoring such a pattern.

A. Well, when you honor that pattern it goes back to the terminology of fair and equitable distributions of reserves.

It's easy in this area to see how that is done,

because our coal thicknesses are basically the same, our gas contents are basically the same. Mr. Emmendorfer has testified that proximity to the outcrop shouldn't make any difference. And we can't quantify a water number, according to their testimony, based on that proximity to the outcrop.

But you can see how this on-pattern spacing has provided for adequate well density to drain the reserves and adequate reserves to justify drilling a well.

Q. Let's look at the relationship of 28 to 27.

A. Okay.

Q. Hallwood, by intention, if you will, has defaulted on its opportunity to drill a well in the southwest quarter, taking the expedient solution of recompleting an existing wellbore in the southeast, right?

A. Right.

Q. And by default, then, they're conceding recoverable gas reserves to any well drilled in the east half of 28?

A. Right.

Q. Isn't that right?

A. Uh-huh.

Q. The west half of 27 is now available for drainage by a well in 28?

A. Oh, you bet. If you take a look at the middle --

I mean, just the distances from the middle of the west half of 27, to either -- either the proposed standard or nonstandard location, those reserves are liable to be drained by either well.

And the pattern provides for that. I mean, you just can't drain the reserves under your lease as a square pattern with some type of radial or elliptical drainage.

Q. Thompson makes the contention that by keeping the wells the equivalent distance from the common section line, that somehow that's fair?

A. No, it's really --

Q. -- response? Well, under this spacing pattern, there are reserves attributable to the 33-2 well that lie in the southwest quarter of 27, southeast of 28 and some in the northwest of 34, just due to the nature of what I've just explained, a radial or elliptical drainage pattern in a rectangular proration unit. But that has been planned on and expected.

However, to pool one in at 57 acres then distorts that pattern and precludes the 33-2 from recovering its fair and equitable portion of those reserves.

Q. In your opinion, is the drilling of the Thompson well a well that's necessary? Or are we going to have two wells competing for the same general area of reserves?

A. Oh, you bet. Two wells -- If these two wells

were not competing, the Commission would have already approved 40-acre spacing for Fruitland wells.

Q. Let's look at the components or the parameters that you used, Mr. Salzman, at determining viable well locations for coal gas wells. You do look at coal thickness, do you not?

A. Yes.

Q. And why is that important?

A. It is one parameter under which you can define gas in place and then recoverable reserves.

Q. And when we look at Mr. Emmendorfer's coal-thickness map, he enjoys that opportunity at a standard on-pattern location, which has an advantage to the off-pattern location, does it not, using that parameter?

A. As far as coal thickness?

Q. Yes, sir.

A. That's right.

Q. Proximity to the Fruitland outcrop is not a concern, as I understand it?

A. According to Mr. Emmendorfer, that is not.

Q. How would you recommend that the well be drilled and completed if the Division requires it to be drilled in the northeast quarter? What would you do? Are you going to drill this as a cased hole or an open hole?

A. I believe that based on Hallwood's completion

analysis, I would drill an open hole in the basal coal section and use an open hole packer.

If you take a look at -- These are the number of months on production, average daily production. The yellow represents the wells in which the open-hole packer was not used.

MR. CARR: Is this an exhibit?

MR. KELLAHIN: Not yet. I'm about to mark it.

MR. CARR: Okay, because I'd like to see a copy.

THE WITNESS: And these wells with the higher rates did use the open-hole packer.

Q. (By Examiner Catanach) Do you have copies of that Mr. Salzman?

A. Ten of them.

And this also is another piece of data that shows why this averaging of ratios, as far as predicting a model, why some of those completion techniques and problems make this model fall apart, as you can see is evidenced by the higher rates from the wells completed with the open-hole packer.

Q. You would complete it in the open-hole fashion in the Basin Coal. How would you stimulate it? Would it be fracture-stimulated?

A. Yes.

Q. Do you have a forecast, based upon your

experience, an estimate of the total volume of water that you would have to remove from a well in this area in order to dewater it and obtain a peak gas rating?

A. With Texakoma's modeling work, average is about 35,000 barrels of water removed to attain a peak rate.

Q. In this area, is that total water volume going to be affected by whether the well is drilled in the northeast quarter of Section 28 versus the southeast of 28?

A. According to Mr. Emmendorfer's testimony -- I'm not a geologist, but according to his testimony, that recharge was not an issue and didn't -- did not -- or was not a controlling factor in that water production.

Q. Do you see any justification, then, for approval of this Application at its off-pattern location?

A. No.

Q. What do you recommend?

A. I would recommend drilling it at the standard location. Because of the outcrop in the northwest part of that section, that coal is still available, and Mr. Emmendorfer's testimony said that those reserves are there and are recoverable. I believe they're economic reserves. And like Paul says, at certain times you've got to drill the well to find out where you are.

We've seen that this model falls apart at very low rates. The 33-2 is a low-rate well. I don't think we

can predict rates and reserves from a production model.

However, from gas in place we know that we -- all of these wells should cum 2.8 to 4 BCF of gas, which is a far cry from his 1 BCF.

However, if he drills the nonstandard location, his ultimate recovery is going to go down, because he's going to be competing with the 33-2 well.

I would recommend drilling it at the farthest south and farthest east location in 28. If this was my prospect and my money, according to the geologist, the reserves are there in the east half.

There's a caveat involved here --

Q. I'm sorry, where were your footages? I've forgotten. In the east half where would you put the well?

A. In the east half?

Q. Yeah --

A. 790 from the east line, and as far south as I could go from the north line. What is that?

Q. In the northeast quarter?

A. Yes. I mean, at a standard location.

Q. I see what you're saying.

A. But that would give me the opportunity to deplete the reserves in the northeast quarter of 28, the southeast quarter of 28.

And then the caveat lies in the fact that the

existing wellbore exception was granted to Hallwood in 27, and there is a good chance that some reserves would be drained from there.

Q. A well at a standard on-pattern location, then, would join the opportunity to recover those gas reserves without being in direct competition with any other well?

A. No, no.

Q. It has no competition, does it?

A. No.

MR. KELLAHIN: That concludes my examination of Mr. Salzman. We move the introduction of his Exhibits 1 through 4.

EXAMINER CATANACH: Exhibits 1 through 4 will be admitted as evidence.

CROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Salzman, do you have a copy of the structure map --

A. Yes, sir.

Q. -- prepared by Mr. Emmendorfer?

Let's go first to your Exhibit Number 1.

A. Uh-huh.

Q. I believe you testified you did not prepare this exhibit?

A. No, sir.

Q. And we have this structure map, and we compare it to the structure map prepared by Mr. Emmendorfer. We have two interpretations of the structure on the base of the Fruitland Coal --

A. Yes, sir.

Q. -- is that not right?

Now, you have reviewed this information on the exhibit, your Exhibit Number 1; is that not true?

A. Yes.

Q. Now, when you started to testify, you -- I believe you testified that you had not looked at the data on the wells from the BLM that are shown on Mr. Emmendorfer's exhibit. Have you seen the four wells that are --

A. Oh, yeah.

Q. -- the BLM wells?

A. Yeah, LP-4, 2, 3 and 1?

Q. Yes. Have you reviewed those, other than just noting them on this exhibit here today?

A. No.

Q. The logs on those wells were not made available to you?

A. And so you don't -- haven't been able to independently check what those might have shown, as opposed to what anybody may have mapped?

A. Exactly.

Q. Okay. If we look at Mr. Emmendorfer's structure map --

A. Uh-huh.

Q. -- and we go into the southwest quarter of Section 28, do you see where the BLM log LP-3 is indicated?

A. Yes, sir.

Q. And below that it says plus 5234?

A. Yes, sir.

Q. Now, if we go over to the structure map you've been working from and we go into the southwest of Section 28 --

A. Uh-huh.

Q. -- we don't see contours there, but if we would place a well spot close to where we have the LP-3 on Emmendorfer's exhibit --

A. Yes, sir.

Q. -- we, in fact, would have a well spot somewhere between the 4500 contour and the 5000; isn't that right?

A. Yes, sir.

Q. And yet the BLM log is showing that well to be at 5234; is that right?

A. Right.

Q. Somebody's wrong here, isn't that fair to say?

A. It's fair to say.

Q. And so either Mr. Emmendorfer is wrong or your geologist is incorrect --

A. Right.

Q. -- as to that? All right.

I think you indicated that what you're concerned with when you deal with the Fruitland Coal rules is an equitable, fair distribution of those reserves?

A. Yes, sir.

Q. And that works well if we're in the heart of the Basin Fruitland Coal and we have section after section where you're able to put a well in the northeast quarter and in the southwest quarter; isn't that right?

A. Oh, you bet.

Q. And if you can produce reserves from Section 28, if you can produce gas, recover gas from Section 28, then it ought to work there too; isn't that your testimony?

A. Oh, yeah.

Q. And you believe that you can recover reserves from all of 28; is that right?

A. No, from the proration unit that we're dealing with here. I did not say --

Q. All right.

A. -- the entire section.

Q. You believe there is recoverable reserves under the east half of 28?

A. Yes, sir.

Q. And you're not talking just about gas in place or the thickness of the formation, but in fact that there is the mechanism to recover that, those reserves?

A. The mechanism by which to dewater that coal, desorb the gas and produce those reserves.

Q. Do you think that the pool rules would provide an equitable distribution of reserves if, in fact, the only producible reserves under Section 28 were in the southeast quarter?

A. That's conjecture.

Q. Well, but we're talking about what would be an equitable distribution of reserves. You would agree with me that if there are recoverable reserves under the southeast of Section 28, that it isn't conjecture that somebody has a right to produce those?

A. Under the rules of the Commission, it requires 320 acres to drill a well.

Q. So if there is only, for the purpose of argument, 160 acres, being the southeast quarter of that section that has recoverable reserves under it, then the owner of those reserves, do they still have to go up into the standard locations and drill wells there? Do you understand --

A. Who would lease 320 acres where you only had 160 acres of reserves? That wouldn't happen, I don't believe.

Any prudent operator, no.

Q. You don't know of an operator that has a 320-acre lease that only half of it is productive?

A. Not here where we're talking about, no.

Q. If we look at the Texakoma well in Section 33 up in the northeast quarter --

A. Uh-huh.

Q. -- that well is not producing at this time; is that correct?

A. That well is producing.

Q. How long has it been producing?

A. Four months.

Q. And if I understood your testimony, for it to get its equitable distribution of reserves out of the reservoir, it will be draining reserves from the southeast of Section 28; is that right?

A. Yes, sir.

Q. And if you locate a well equidistant from that common boundary where we're proposing, 790 from the lease line, would you expect there to be net drainage toward either of those tracts, along that common lease line?

A. Okay, let's start that one more time. I lost you.

Q. All right, you've got wells equidistant from a common lease line, a proposed location, and your well in

the northeast of 33 --

A. Okay.

Q. -- and they're both producing. Based on what you know of this reservoir, would there be net drainage across that lease line?

A. In a radial pattern, an elliptical pattern?

Q. I don't care what pattern.

A. Well, you're -- That's theory.

Q. Well, I'm asking you for your opinion. You've qualified as an expert, and I'd like your expert opinion as an engineer to tell me if in a situation where you have two wells equidistant from a common lease line and both are producing at unrestricted rates, do you see drainage across that lease line, or should that be reasonably close to the no-flow barrier?

A. That would be a no-flow barrier under your assumptions.

Q. All right. And now go with me and assume that there isn't a well in Section 28. Without that the reserves from Section 28 are going to be drained toward the well in 33; isn't that right?

A. Yes, sir.

Q. And if, for whatever reason -- Just ride with me, take this as an assumption, that I can't drill in the northeast or the southwest of that quarter, there's no

other way for me to produce the reserves in the southeast unless I drill a well there; isn't that right?

A. That is right, but that does not relate to a fair and equitable share of the gas in the reservoir --

Q. Well --

A. -- and I'll tell you why, because a standard location would be draining some of the --

Q. Standard location, what section?

A. In 28, would be draining some of the reserves out of 22, southwest quarter, southeast of 21 --

Q. Let me back up.

A. -- and some --

Q. A standard lo- --

A. -- in the west half of 27.

Q. I'm talking now about in the southeast quarter. I'm saying that you -- for the purpose of the argument, if you can't drill a well and produce reserves in either the northeast or the southwest of 28, you have to drill in the southeast? I mean, it's a simple question.

A. If I can't drill in the northeast, do I have to drill in the southeast?

Q. If you can't drill in the northeast or the southwest and you've got reserves in the southeast, obviously you have to put your well there, don't you?

A. Under your assumptions, yes, sir.

Q. And yet where we differ is, you think we can locate a well in the northeast, and we do not? Isn't that a fair way to characterize our differ- --

A. You bet. I think that's why we're here.

Q. Let's take a look at Thompson Exhibit Number 3.

A. You bet.

Q. This is up in Valencia County where I believe you testified they have --

A. Valencia Canyon.

Q. Canyon?

A. Canyon.

Q. Canyon. -- where they have three times the gas in place as they do in the area we're talking about in this area.

If we look at Section 31, we still do have a section that is traversed on the west side by the Fruitland outcrop; isn't that right?

A. Uh-huh, yes.

Q. They are similar in that regard?

A. Yes.

Q. And if we look at the three wells that are on this tract, the one in the northeast quarter has produced 1/100 of a BCF and 375,000 barrels of water?

A. Right.

Q. And that's not a very good well, is it?

A. No, sir.

Q. And if we go down to the southwest quarter and we see 2/100 of a BCF and 381,000 barrels of water, that's not a very good well, is it, either?

A. No.

Q. However, if we go over to the well in the southeast quarter, we have 1.3 BCF and only 192,000 barrels. That's a much better Fruitland Coal well, is it not?

A. Uh-huh.

Q. And basically what we have here is, the well away from the outcrop is a better well? Do you agree with me on that?

A. Yes.

Q. And when we look at our section, although we have only one-third the gas in place, we still have a situation where we are proposing a well as far away from that outcrop and monocline as we can get; isn't that right?

A. Yes.

Q. Now, if we go to your Exhibit Number 3 -- and don't let me misstate you, but I don't believe you're signing on to the monocline theory; is that a fair statement? You --

A. Explain to me --

Q. Do you believe -- Do you believe that you should

try to drill wells away from the monocline, if you're going to make a good well?

A. Theory on monoclines says that you ought to drill at the base --

Q. -- of the monocline?

A. -- of a monocline, because that is where you get maximum flexure and maximum fracture.

Q. Okay. And so it would make sense, if Mr. Emmendorfer is correct, to place a well at the base of the monocline where he's trying to do it; isn't that right?

A. No, I think his theory was, Basinward from that maximum flexure.

Q. Now --

A. He wants to stay away from the maximum flexure. Physics tells me that that's where the most fractures are going to be, and they'll be parallel to strike.

Q. Would you be in agreement with Mr. Emmendorfer that what you want to be is not on the monocline itself?

A. Is that -- I don't understand the theory. He said that the distance to that outcrop made no difference, because the coal was of consistent physical nature, I mean thickness and gas in place, and that that didn't make any difference.

So I don't understand how I'm supposed to delineate on the monocline, on the syncline or into --

Well, high dip, high flexures or flat formations, I don't know how to --

Q. Basically --

A. -- quantify that.

Q. Basically you're saying that you don't understand his theory as to why he would want to be in the southeast corner of the east-half spacing unit in 28; isn't that right?

A. Yeah, I don't see any difference in those two locations, as far as the ability to produce economic quantities of gas.

Q. All right. If we look at your Exhibit Number 3, you were talking about the Hallwood well in the southeast of Section 27?

A. Yeah.

Q. And I believe it was your testimony that this was an expedient place to test the Fruitland because there was an existing well at that location?

A. You bet. And there was probably a log run -- I don't -- They could take a look at the coal and the quality and the entire deal.

Q. And it was -- Was it your testimony that by going to that location, in fact, Hallwood was conceding drainage to the offsetting wells?

A. On a purely physical basis, anything in the west

half is liable to be drained by anything in the east half of 28, any well drilled in the east half of 28. Those reserves would be available to drainage.

And going back to your assumptions, all things being equal, and I think you said producing unrestricted.

Q. Let's move from that well, where they drilled at a convenient location, to Section 24 on the right edge of your exhibit, all right? Do you see Section 24, right side of the exhibit, second full section down?

A. Yeah.

Q. And we have a Hallwood well in the southeast-southeast in that section too, do we not?

A. Uh-huh.

Q. That was a new drill, was it not?

A. Uh-huh.

Q. It's been plugged and abandoned, has it not?

A. Uh-huh. Is that the USA Number 1?

Q. I don't know the number of the well.

A. Is that --

Q. That is the USA Number 5.

A. Okay, Number 5.

Q. That well has been plugged and abandoned?

A. Yes, sir.

Q. And it has been plugged and abandoned because they could never get it to dewater, isn't that right?

A. I don't know, honestly. I think there was a mechanical failure.

Q. If you go directly -- If you go directly west of that, there is a gas well spot. I'm talking about the right spot of the two in that southwest of 24. That well is experiencing the same problem, is it not? They can't get it to dewater?

A. Spot me again?

Q. It's the well, if you go from the one we were just talking about in the southeast of 24, go due west, it's the first gas spot of the two on that in the southeast. It's the -- In the southwest quarter of 24, it's the easternmost of those two gas spots.

That well is also having problems because they can't get it to water -- to dewater; isn't that right?

A. I'm not -- I'm not -- I don't work for Hallwood.

Q. Was it your testimony that back on the well in the southeast of 27 that it was not going to drain reserves from the southwest of 27? I just didn't hear you.

A. I don't -- If I said that, that's not what I mean.

Q. Okay.

A. You know, if a 320-acre spacing is what we interpret now as adequate to drain, we've got -- the proration units would be laydowns, then. And it would

drain some reserves from that southwest quarter in a radial or elliptical pattern.

Q. Mr. Salzman, the reason you're here today for Texakoma is that you're concerned that a well at the proposed location is going to reduce the reserves produced by your well, the 33-2; is that not right?

A. Yes.

Q. And you believe that by putting the well where we're proposing, that you're going to get your fair and equitable distribution of the reserves in the reservoir; is that not right?

A. Right.

Q. And with a well where you're placing the 33-2, and without a well north of it as we're proposing, it's obviously going to drain reserves from the offsetting sections; is that not correct?

A. I think that's why the patterns were set up that way, to keep that consistent.

Q. And if Thompson is to be able to also get its fair and equitable distribution of reserves in the Fruitland, it needs to not only have a well in the northeast quarter, but a well that can effectively drain the reserves, correct?

A. Correct.

Q. And you believe that a well at that location

could effectively drain that spacing unit?

A. More effectively drain the spacing unit than the nonstandard location.

Q. And you believe that that well is not on the monocline; isn't that right?

A. I believe it's not -- ?

Q. -- on the monocline itself, at a standard location in the northeast?

A. How far from the north line?

Q. Where you're proposing it.

A. Oh, where I propose it?

Q. Yes.

A. No, on my map, if you take a look at the 5500 contour, the 5000 and 4500 contour, that well would be at the base of the monocline, in the area of highest flexure, which in my opinion is the area of highest fracturing, and in most people's opinion the area of a higher IP than on that monocline.

Q. And to get to that point, we have to assume that the geological interpretation you're working with is correct, and not the one that Mr. Emmendorfer has integrated BLM data into, correct?

A. As far as depths above sea level?

Q. As far as the location of the monocline.

A. Okay, let's go through that one more time.

Q. If we look at Mr. Emmendorfer's structure map --
A. Yes, sir.
Q. -- the monocline comes right through the northeast of Section 28, does it not?
A. Yes.
Q. If we look at yours, it does not?
A. Yes, it does. The monocline comes through the northeast.
Q. But your well location is not placed in the center of the monocline as it would be if we used Mr. Emmendorfer's interpretation; is that not correct?
A. Well, you know, it's very hard to tell. And like Mr. Emmendorfer has testified, his draftsman was having problems due to the thickness of these lines. This was also hand-drawn and not computer-generated.

If you take a look at the smoothing of the computer-generated curve, you'll find that it may be, as far as your distance between contours, at any -- or between any two data points may provide a more accurate interpretation than a hand-drawn one where -- You know, these contour lines are 100-foot contours, and the width of those -- the width of those ink lines, assuming that the section is 5280, I'd say those -- the width of them is 100 feet. So it may be difficult to say.

Q. Well, whether we're computer-generating or hand-

drawing, wouldn't it be important to you to have all data available in the area integrated into your geologic interpretation?

A. You bet.

Q. And wouldn't you want the BLM data?

A. You bet.

Q. And that data is commercially available, and if you were doing this again wouldn't you want that integrated into your interpretation?

A. If I were paying for it, I'd want it.

Q. And if we have a well at your location, the location of your 33-2 well and no offsetting well, in fact, you're going to be draining reserves from the southeast of Section 28; that's correct, is it not?

A. To an extent, yes.

Q. And you've been talking about the number of barrels of water you have to produce to generally get a well in this area to its peak producing rate?

A. Right.

Q. And you said 35,000 barrels?

A. As an average of the Texakoma wells.

Q. And that's just an average, is it not?

A. And that -- That is just an average.

Q. And you have to look at the individual well to really know what it takes to get that well --

A. Yeah, because -- I mean, as we've seen, averaging techniques and trying to predict from arithmetic averages falls apart when we're dealing with wells of this nature.

MR. CARR: That's all I have.

MR. KELLAHIN: No, sir, nothing else.

EXAMINER CATANACH: Just a couple.

EXAMINATION

BY EXAMINER CATANACH:

Q. Where do you estimate the base of that monocline to be? At 4500, more or less? Is that where you're estimating that?

A. I've got a -- yeah, the base of the monocline -- and it's hard to tell -- What direction are you wanting to come from? If we're coming from the north to our yellow dot, I would say the 5500, 5000 and 4500 are equidistant, showing a monocline.

Right there at 4500, at the yellow location, standard location, is where your flexure, your maximum flexure, starts. That's where those lines start getting closer together. That is the start of the curve. I think Alan described that as the second derivative. You would take the second derivative to find the arc of that or the angle of that. The rate of change is what it is.

But the base of that monocline, yes, is at about that location.

Q. So would you want to go any further north or east -- I'm sorry, north or west of that yellow dot? Would you feel safe in going any further north or west?

A. Based on the fact that there probably are reserves in the southeast quarter of 21? Based on everyone's analysis here, I don't think it would hurt.

However, if you want to maximize the reserves I'd put it right there, because it's going to be equidistant between the northeast of 33, the southeast of 27 and the northeast of 27. I think that's -- would maximize my recovery.

Q. Do you know what the 33 Number 2 is currently producing at?

A. Yes, sir. Production report for 3-18-97 was 40 MCF, 50 barrels of water, at a flowing tubing and casing pressure, 41 on the tubing, 47 on the casing. That well is on pump.

Q. Would you expect -- If a well was drilled in the southeast quarter of Section 28, would you expect that well to exhibit similar producing rates as the 33-2?

A. In the southeast of 28?

Q. Yes, sir.

A. No, I don't think that you have -- you know, on that pattern with a -- Did you say southeast or southwest?

Q. Southeast.

A. Oh, southeast. Would I expect it to have rates comparable to the northeast?

Q. Comparable to the 33-2, to that well?

A. I think all things being equal, it would be more, because I've got competition with my 33-1 down here, as to where a southeast quarter of 28 would have no competition to the north. I mean, all other things being equal.

Q. Texakoma's position in this case is that the proposed location should be denied and the Applicant should be required to drill a well in the northeast quarter. That's your position?

A. At a standard location.

Q. And you're not proposing that they be allowed to drill in the southeast, subject to any kind of production penalty?

A. I'm not familiar with those penalties. I know that it happens a lot in the southeast part of the state, where you're dealing more with reef and algal-type deposits. But I don't know how that would be allocated.

And I can't speak for Texakoma. If you were to offer a compromise and would I agree, I couldn't -- I couldn't do that. I see no reason why a northeast well couldn't and shouldn't be drilled.

So my position is, a standard location.

EXAMINER CATANACH: Okay, thank you.

EXAMINATION

BY MR. CARROLL:

Q. Mr. Salzman, you heard the testimony earlier about the proposed Merrion well in the southeast quarter of 22?

A. Right, yes.

Q. Why do you think Merrion moved that well to the southeast when the standard location would be in the southwest?

A. Because his proration unit in the southwest would be a standup, and if you take a look at the northwest corner of that section it has an outcrop, and that doesn't provide the opportunity to make as many -- as much gas as in the southeast quarter.

You see the outcrop runs -- I think I'm -- Both maps, it's pretty similar.

FURTHER EXAMINATION

BY EXAMINER CATANACH:

Q. Could Merrion be proposing that location for the same reason that Thompson is proposing theirs? Is that possible?

A. Well, you've got the nonstandard here. If this southeast of 28 is approved, you've got the pattern so screwed up you -- I'd have to think about that.

Q. You don't know why Merrion is proposing to drill

at that location?

A. Okay.

EXAMINER CATANACH: Okay, we're not going to ask you to speculate.

Is there anything further?

MR. KELLAHIN: I have a closing statement --

EXAMINER CATANACH: Okay.

MR. KELLAHIN: -- but I'm through with this witness.

EXAMINER CATANACH: The witness may be excused.

Go ahead, Mr. Kellahin.

MR. KELLAHIN: Mr. Catanach, I'm getting old and tired and often cranky, but I can still remember a few years ago that you and I and Brother Carr went to the San Juan College in Farmington, and we spent hours, days and months developing comprehensive rules for the coal gas development of San Juan Basin.

And we were pretty smart that month and that week, and we developed some very impressive rules, I think. We recognized in the industry and among us that there was the necessity, based upon the science presented, to create a system of true 320-acre gas development.

And we intentionally and consciously put the off-pattern requirement in the rule. And we did it for a number of reasons, not the lease of which is recognizing

that in southeastern New Mexico, simply by case-by-case exception, simply by a case-by-case accommodation in the absence of opposition, if we weren't careful in a pool, then you turn a pool in to be spaced less than you intended. And you can, by granting exceptions to off-patterns, develop a system of a new pool rule.

We were careful to recognize that there would be areas in the Basin that may require different spacing, and we developed a detailed set of parameters, conditions and requirements to set aside an area for special pool rules.

I caution you that if you're not careful with this case, recognizing what Merrion has asked to do, and seeing the exceptions that are going to be created, we are going to have an area of the Basin that by exception defaults to 160-acre gas competition.

I contend that if you grant this exception, then you'll have to grant all other exceptions. There is simply no way you can every deny another application. You can kiss 320 gas spacing in the Fruitland Coal goodbye. And because if you buy Mr. Carr's argument, then you can never deny any other similar based argument again.

His argument is that the correlative rights of Thompson are impaired or affected unless he gets the off-pattern location. Correlative rights is the opportunity to recover recoverable gas.

In order for Thompson to get to that argument, they must absolutely prove they cannot drill an on-pattern location, and therein lies the flaw in their argument.

We sat here at length, trying to understand what is wrong with the on-pattern location. We can't put a finger on it.

If the concern is that you need to be on the platform of this monocline, where is the evidence to show us that that's not successful? The concern is not about coal thickness. In the northeast quarter you've got better coal thickness than in the southeast quarter.

We asked at length that they were concerned about the infiltration of fresh water as a result of the outcrop. It may have been some concern, but they haven't studied it and quantified it. As best I can understand, is, there is some theoretical concern that the water-production volumes may be higher in the northeast quarter. Let them go out and study it, show it, present the evidence.

All the evidence shown here is to demonstrate that a well at a standard on-pattern location should be reasonable. The excuse here is that you need to be a like-kind distance away from the Texakoma well; and if you're not, then Texakoma gets to drain some of the off-pattern spacing units.

We authorized off-pattern drainage when this

Division and Commission accepted the off-pattern requirements of the coal gas Fruitland rules. We authorized offset drainage. We recognized that adherence to this pattern was necessary.

We also recognized that when an area became unique, that we would call for a special pool rule hearing, and we'll let everyone decide if we should have competition in this area on 160 acres.

And so if you grant this Application, you have just decided the competition in this portion of the reservoir is going to take place based upon 160 acres.

The problem about that being unfair is that up to now the players in here have made their investment based upon the recognition by the Division that we would remain on pattern.

And perhaps it's my fault as much as anyone that we have allowed and accommodated operators like Hallwood, in the absence of any opposition, to utilize an existing wellbore. It's expedient, it's -- you feel comfortable in doing it, giving them a chance to do this thing.

But quite frankly, I think we've made a serious mistake by allowing the exceptions, then, to create an opportunity whereby the exceptions become the rule.

I can find no reason to grant an exception in this case, Mr. Examiner, and we would request that you deny

the Application and require this Applicant to drill a standard location.

Think about the precedents you set in this case. Think about the other cases that you've had where you've tried to deal with establishing equities for a well in an off-pattern spacing unit. I think you still remember the Reed and Stevens case, where in that reservoir there was off-pattern exceptions, and you granted it and you struggled considerably in trying to figure out a penalty formula.

Well, take the difficulties of that Reed and Stevens case and multiply it tenfold when you figure out how to establish equity in a reservoir that doesn't operate like a conventional sandstone reservoir. You've got to dewater the coal, you've got to figure out a peak rate, you've got to go through all the science to figure out what your ultimate gas recovery is going to be.

Where is the Applicant's evidence of his recoverable gas that he's threatening he's going to lose? Where are his estimates of his gas in place by which we get recoverable gas? He's not done the science, and yet he wants the benefits of an exception.

I contend that Thompson went in with their eyes open, they took a farmout from Hallwood, they originally intended to drill a standard location, and only after the

fact that Mr. Emmendorfer suggested that he needed the unorthodox location are we now here. And the reason is that he wants to be Basinside of this anticlinal bend for which he has no indication or proof that he needs that advantage.

We contend that if you need exceptions in this part of the pool, it's premature to ask for them until you've done the science and the homework. It is our belief that the well that Texakoma has in Section 5 is going to be a commercial, profitable well.

Explain to me and figure out the ambiguities, the inconsistencies with the contention by Mr. Thompson that he's only going to get a BCF of reserves at his well location, and yet 1500 feet away at the Texakoma location that well is going to get four BCF?

I can't figure it out, but my degree is in English, not engineering. I'll let you figure out if that makes sense to you.

Does it make sense to grant this exception? Does it make sense to create an opportunity for an unnecessary well to compete? We believe not, and we would ask that you deny this Application.

EXAMINER CATANACH: Thank you, Mr. Kellahin.

Mr. Carr?

MR. CARR: Mr. Catanach, Mr. Kellahin and I agree

about one thing: He has become old and cranky.

He also is sitting before you today wrestling with an trite and old adage that every lawyer has to endure, and that is the simple statement that when you don't have the law you argue the facts, when you don't have the facts you argue the law.

Well, he doesn't have the facts, so he's here today arguing about a rule. He's asking you to cast this rule in stone.

But when we did go to Farmington, we adopted rules and proposed rules that were designed to protect correlative rights. And your duty here today is not to be narrow, not to say the rule is the rule, but to do what statute charges you with doing, and that is to act and protect correlative rights. And when rules impair correlative rights, exceptions to those rules are granted. That's why we're here.

The rules that were adopted for the Basin Fruitland Coal Pool work in the heart of the pool. They do give you a fair, equitable distribution of reserves if you're in the middle of the pool and you have a section where you can, from a standard location, produce what is under your tract, for there you have an opportunity to produce your just and fair share.

But when you move out to the edge, when you get

where you're near the outcrop, where you're contending with a monocline, where the locations are limited, you have to let the rule bend. Because if you don't, you tell Mr. Thompson, You own the value property interest, while you have a right to go out and develop it, but the rule is the rule, and you have to drill where you'll never be able to water out your well -- or dewater the well.

It will be just like the Hallwood wells in Section 24. Go to it, throw your money in the ground. We know there are reserves there, but the rule is the rule, and you can't get it.

That's what Mr. Kellahin is asking you to do. He's asking you to sign on to that kind of a scheme, to keep someone away from the Texakoma well so they can, without competition, drain reserves that belong to somebody else, someone else who wants you to get them what you're required to do, I submit by law, the opportunity to go out and produce those reserves. They want to be as close to Texakoma as Texakoma is to us.

Mr. Salzman says, What -- In that case, they'll even drain more, if all things are equal. Mr. Catanach, all things aren't equal. You can look at these exhibits. We're right on the edge of the reservoir. The monocline runs, by everybody's interpretation, pretty much through our tract.

And the interpretations do vary, the geological interpretations, but I submit it's because we've honored all the data, we have the BLM wells on our exhibits, and they do not.

They're not telling you, We're here because we're worried about not having an opportunity to produce the reserves under our acreage. They're here saying, You're going to impair our well's ability to produce, and to protect our well you have to tell us we can drain Thompson. That's what this is about. It's absolutely ridiculous.

All we want to do is, at the edge of the reservoir, have you say that there is enough flexibility in the Oil and Gas Act and in the rules that are promulgated pursuant thereto and in the authority you have to grant exceptions to those rules, to let us go forward, give us the opportunity to protect our correlative rights with a well that absolutely cannot drain their own acreage. Their own witness says it will be right up against the no-flow boundary.

Without it, well, you're telling us that because years ago in the San Juan Community College we adopted some rules, that when you get out to the edge of the reservoir where they don't work, the remedy isn't an exception, it's impairment of correlative rights.

We think you have one choice if you're to meet

your duty under statute. That is to approve the location and let us develop our fair and reasonable share of the reserves that are under our tract, not deny us our correlative rights.

EXAMINER CATANACH: Thank you, Mr. Carr.

I'm not going to ask for rough-draft orders. What I am going to ask for is, if you would summarize your geologic and engineering points on each side. Just submit those to me within a couple of weeks.

MR. KELLAHIN: We can do that.

EXAMINER CATANACH: Fine.

MR. CARR: Just a summary of the case?

EXAMINER CATANACH: Just a summary of the -- your engineering conclusions, your geologic conclusions, some of the points you want to make.

MR. KELLAHIN: Okay.

EXAMINER CATANACH: And with that, we'll -- there being nothing further, we'll take this case under advisement.

And we'll go ahead and continue the Case 11,516 to May 1st at this time.

And we'll adjourn this hearing.

(Thereupon, these proceedings were concluded at 5:03 p.m.)

* * *

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 April 7th, 1997.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11728, heard by me on March 20 1997.

David R. Catanach, Examiner
Oil Conservation Division